

Executive Summary

The South Carolina Department of Health and Environmental Control (SCDHEC) Environmental Surveillance and Oversight Program (ESOP) conducts monitoring on and around the Savannah River Site (SRS) to accomplish several objectives: to understand the presence and movement of contaminants from the SRS; to quantify those contaminants; to determine the impact to the communities surrounding the SRS; to provide a means of evaluating data reported by the Department of Energy-Savannah River (DOE-SR); and to provide the public with a source of information independent from the DOE-SR that evaluates radiological and non-radiological contaminants in the environment stemming from present, past and future SRS operations and facilities.

The ESOP environmental surveillance network includes: calculating dose to the public from SRS releases; determining Radiological Atmospheric Quality Adjacent to SRS; monitoring Groundwater Quality Adjacent to the SRS; Drinking Water Quality Monitoring; Radiological Surface Water and Sediment Surveillance; Non-Radiological Sediment and Surface Water Quality Monitoring; Radiological Surveillance of Surface Soils On and Adjacent to the SRS; Radiological Monitoring of Terrestrial and Edible Vegetation On and Adjacent to SRS; Radiological Monitoring of Dairy Milk; Radiological Monitoring of Fish in the Savannah River; Game Animal Monitoring Adjacent to SRS; Oversight Monitoring and Support Activities associated with Deactivation & Decommission (D& D) activities and site clean up activities.

The implementation of radiological and non-radiological surveillance monitoring by ESOP has resulted in a significant increase in our understanding of the concentrations and movement of radioactive contaminants in the environment on and around the SRS. The knowledge gained aids in tracking releases from Site facilities, identifying pathways for potential exposure and coordinating with emergency responders for more effective emergency planning. ESOP is also actively involved in field oversight projects to verify the validity and effectiveness of monitoring activities at Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) sites and D & D sites. Additional projects are being considered to provide information for new proposed SRS facilities, fill data gaps, and evaluate other SRS non-regulatory monitoring programs. The on-going improvements in monitoring capabilities underscore the commitment by the SCDHEC to fulfill its mission to protect the public health and the environment, reinforcing the DOE's commitment to improving open communication and cooperation with host states.

For 2003, the ESOP monitored all pathways for human exposure to radiological contaminants from the SRS. In general, the SCDHEC ESOP results indicate that while there continues to be a measurable impact on the environment from the SRS, the values are, in most cases, below established Federally mandated contaminant guidelines, and the results are consistent with those values reported by the DOE-SR.

Radiological Atmospheric Quality

SCDHEC uses particulate sampling, Thermoluminescent Dosimeter's (TLD)'s, and precipitation sampling around the SRS to measure atmospheric concentrations of radionuclides. For 2003, no EPA standards were exceeded at the monitored locations and while radiological pollutants from SRS were detected, they had no significant impact on local air quality.

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Ambient Groundwater Quality

The ESOP monitoring network consists of a number of wells located around the SRS. For 2003, 31 wells were sampled for a variety of parameters. Various contaminants were detected in a number of the wells at very low levels. In several of the wells some contaminants above the EPA standards were detected including lead, gross non-volatile beta, and radium-226/228. An evaluation of the data suggests that the contaminants detected are the result of naturally occurring deposits and are not at this time related to SRS activities.

Drinking Water Quality

Tritium continues to be the most abundant radionuclide detected in public drinking water supplies impacted by SRS and Plant Vogtle. It was detected in both surface water and ground water. The levels detected however, were low compared to the EPA standard for tritium. Gross alpha, non-volatile beta and gamma emitting radionuclides were also detected but were below their respective Maximum Contaminant Levels (MCLs) and appear to be from naturally occurring deposits.

Radiological Surface Water and Sediment Monitoring

All major streams on the SRS are routinely monitored by the ESOP. Tritium continues to be the primary radionuclide detected at the highest levels on site streams and in the Savannah River. The levels detected are higher than background locations. Four Mile Creek and Pen Branch continue to have the highest concentrations. Concentrations at public access points were below the EPA standard for tritium except for the Four Mile creek mouth. Gross alpha, gross beta and cesium -137 activity was detected in several streams. Upper three runs indicated the highest alpha activity in 2003. Sediment sampling also indicated the presence of Cesium-137 in at least one stream location.

Non-Radiological Surface Water and Sediment Monitoring

Metals were detected in sediment samples from many of the SRS streams at levels that were above the state average but below any established Maximum Contaminant Levels (MCLs). Nitrates in Four Mile Creek continued to be the primary contaminant above the state average in surface water. The levels however, are still below the EPA MCL. Other water quality parameters measured compared favorably with the South Carolina fresh water standards.

Surface Soils Radiological and Non-Radiological Monitoring

For 2003, ESOP sampled soils for metals, and some radioactive constituents. A number of metals were detected that were consistent with coastal plain soil profiles. Cadmium was detected but was within 3 standard deviations of the state average and is not considered excessively high. Radiological testing indicated the presence of potassium-40 and Ra-226 but at levels that could not be separated from background. Cesium-137 was also detected in samples and may be the result of historical depositions from nuclear testing or from SRS operations.

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Terrestrial Vegetation on and Adjacent to SRS

Tritium was detected around SRS and was relatively uniform except on the western side where it was an order of magnitude higher. The concentrations tend to decrease with distance from SRS and are probably the result of SRS releases. The western side of SRS again showed the highest concentrations (vicinity of D-area and Plant Vogtle). Potassium-40, beryllium-7, lead-212, lead-214 were detected from several monitoring locations where gamma analyses were conducted but are naturally occurring and are considered to be background. Cesium-137 was detected at eight of the 13 perimeter stations. The highest level was on the north side of SRS and was considerably higher than other results.

Radiological Monitoring of Edible Vegetation

Edible vegetation samples were collected in 2003 and evaluated for tritium and gamma emitting radionuclides. Tritium was detected in 7 of the 11 sample locations but ESOP detected no man made gamma emitters.

Radiological Monitoring of Dairy Milk

For 2003, tritium and strontium-90 results were above background in some cow milk samples. Goat milk sample results showed tritium, strontium-90, strontium-89, and cesium-137 in some samples. A portion is from legacy nuclear atmospheric testing but some contribution could be from SRS or Plant Vogtle operations. Additional study is being conducted to determine the fraction attributed to SRS and Vogtle.

Radiological Fish Monitoring

SCDHEC ESOP data indicates that SRS operations have impacted fish adjacent to and down stream from the SRS in the Savannah River. Tritium, cesium-137, and strontium were detected in all fish species evaluated but not at all locations. The results while not identical are consistent with historical trends and values.

Game Animal Monitoring

White tailed deer were evaluated for the presence of radiological contamination. Cesium-137 was detected in some deer in all of the zones where deer were harvested. Certain zones showed deer with higher levels than others, which may indicate an impact in those areas over and above levels that would be expected from historical atmospheric testing fallout.

FFA Oversight Monitoring

ESOP monitoring was for quality control purposes. Sampling procedures were observed and evaluated for several sites and a number of samples were split during the 2003 monitoring period. Appropriate sampling methodologies were observed. While a number of sample results were above established regulatory guidelines, the ESOP and DOE-SR results were

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comparable in most cases with the exception of a lead-212 result. Since this was a soil sample, the variability could be the result of lack of homogeneity of the sample or with the depth of the sample collection.

Potential Dose to The Offsite Population

The doses produced by SCDHEC are calculated from radiation activity concentrations for all exposure media sampled. Data provided was collected primarily from off-site locations and summarized as annual average concentrations for each contaminant to calculate the potential radiation dose to the Maximally Exposed Individual (MEI). The SCDHEC dose calculations indicated that the total dose from all SRS pathways combined contributed less than 4.85-mrem to the swamp based MEI, and less than 4.17-mrem to the average perimeter residing public for 2003. The dose received from SRS is estimated to be approximately 60 times less than that received from naturally occurring sources.

Critical Pathway Study

Throughout it's operational history there have been documented instances of radiological materials being released to the environment from the SRS. From historical document reviews performed and data collected, the primary contaminants released and the exposure pathways were identified. A critical pathway assessment of the SRS was performed by the ESOP with emphasis placed on releases from the past eight years. The ingestion and inhalation routes are the major mechanisms for exposure to radionuclides from SRS. Consumption of vegetation, surface water, fish, and game animals were the major contributors to the ingestion exposure route. The greatest source of exposure to the public is provided through the sportsman on-site and off-site hunter-fisherman exposure pathway. Specific radiological contributions to dose released into the atmosphere by the SRS in 2003 were tritium, iodine-129, cesium-137, and plutonium-239. Radionuclides that make up key contaminants in liquid releases from the SRS include tritium, strontium-90, iodine-129, and cesium-137.

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Glossary

Ac-228	Actinium-228
BDC	Beaver Dam Creek
Be-7	Beryllium-7
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CONGAREE	Congaree River
Cs-137	Cesium-137
CSWTF	Central Sanitary Wastewater Treatment Facility
D&D	Deactivation and Decommission
DER	Duplicate Error Ratio
DOE-SR	Department of Energy-Savannah River
ECODS	Early Construction and Operations Disposal Site
EMS	Environmental Monitoring Section
EPA	Environmental Protection Agency
ERAMS	Environmental Radiation Ambient Monitoring System
ESOP	Environmental Surveillance and Oversight Program
ETF	Effluent Treatment Facility
FDA	Food and Drug Administration
FMC	Four Mile Creek
GADNR	Georgia Department of Natural Resources
ICRP	International Commission of Radiological Protection
I-129	Iodine-129
K-40	Potassium-40
LLD	Lower Limit of Detection
LSD	Lower Savannah District
LT	Less Than
LTR	Lower Three Runs Creek
MCL	Maximum Contaminant Level
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
MEI	Maximally Exposed Individual
MFC	Membrane Fecal Coliform
N	Number of samples
NPDES	National Pollutant Discharge Elimination System
NSBLD	New Savannah Bluff Lock & Dam
ORWBG	Old Radioactive Waste Burial Ground
Pb-212	Lead-212
Pb-214	Lead-214
PRG	Preliminary Remediation Goals
QA/QC	Quality Assurance/Quality Control
R	dry/wet weight ratio
REMD	Radiological Environmental Monitoring Division
SAVR	City of Savannah
SCDHEC	South Carolina Department of Health and Environmental Control
SD	Standard deviation
SE	Site Evaluation

Glossary

SOP	Standard Operating Procedure
SRS	Savannah River Site
Sr-89	Strontium-89
Sr-90	Strontium-90
STC	Steel Creek
STEVENS	Stevens Creek
STL	Severn-Trent Laboratories
STOKES	Stokes Bluff Landing
Tc-99	Technitium-99
TCLP	Toxicity Characteristic Leaching Procedure
TSP	Total Suspended Particulates
TLD	Thermoluminescent Dosimeter
USEPA	United States Environmental Protection Agency
US 301	United States Highway 301
USGS	United States Geological Survey
UTP	Unidentified Trash Pile
UTR	Upper Three Runs Creek
VEGP	Vogtle Electrical Generating Plant
WSRC	Westinghouse Savannah River Company

Units of Measure

L	Liter
ml	milliliter
pCi/L	picocuries per liter
pCi/g	picocuries per gram
g/L	grams per liter
pCi/m ³	picocuries per cubed meter
mg/kg	milligrams per kilograms
mg/L	milligrams per Liter
mrem	millirem
ppm	parts per million

1.1 Radiological Atmospheric Quality Adjacent to Savannah River Site

1.1.1 Summary

This project provides independent monitoring of atmospheric radionuclide concentrations associated with the Savannah River Site (SRS). It also provides monitoring of atmospheric media on a routine basis to measure radionuclide concentrations in the environment and to identify trends that may require further investigation. Radiological atmospheric monitoring sites are established to provide spatial coverage of the project area.

South Carolina Department of Health and Environmental Control (SCDHEC) air monitoring capabilities in 2003 included air monitoring stations with the capacity for sample collection using glass fiber filters, precipitation, silica gel columns, and thermoluminescent dosimeters (TLDs). The glass fiber filters were used to collect total airborne particulates. Particulates were screened weekly for gross alpha and gross beta. Precipitation, when present, was sampled and analyzed monthly for tritium. Silica gel distillates of atmospheric moisture were analyzed monthly for tritium. First quarter glass filters were composited and analyzed for specific radioisotopic particulates. TLDs were collected and analyzed every three months for ambient beta and gamma levels. ESOP monitors radionuclides in atmospheric media around the SRS at potential public exposure locations.

All SCDHEC data collected substantiated historically reported United States Department of Energy-Savannah River (DOE-SR) values for radionuclides in the ambient environment at or near the SRS boundary.

In general, average SCDHEC atmospheric radiological monitoring results at the SRS boundary were essentially the same as the DOE-SR reported average values. Small variations in atmospheric radiological monitoring results between SCDHEC and DOE-SR are likely a result of differences in monitoring locations, local meteorological conditions, and number of locations.

In summary, no United States Environmental Protection Agency (EPA) air standards were exceeded at the monitored locations and there were no significant elevations of radiological pollutant concentrations associated with SRS operations. Sampling results by SCDHEC indicate that SRS activities had a measurable impact for tritium, but an insignificant impact on local air quality.

RESULTS AND DISCUSSION

Gross Alpha

During the 2003 sampling period, gross alpha activity ranged from 0.001 to 0.014 picocuries per cubic meter (pCi/m^3). Values in this range are typically associated with naturally occurring alpha-emitting radionuclides, primarily as decay products of radon, and are considered normal.

If gross alpha counts are above the normal range of $0.014 \text{ pCi}/\text{m}^3$, the filters are analyzed for specific radioisotopes. The average gross alpha nuclide concentration in 2003 was $0.004 \text{ pCi}/\text{m}^3$.

Gross Beta

During the 2003 sampling period, gross beta concentrations ranged from 0.010 to 0.040 pCi/m³. Values in this range are typically associated with naturally occurring beta-emitting radionuclides, primarily as decay products of radon. Small seasonal variations at each monitoring location have been consistent with historically reported SCDHEC values. The EPA, Office of Radiation and Indoor Air, uses gross beta counts as an indicator to determine if additional analyses (i.e., gamma scans) will be performed. This is the tiering of definitive analyses that is used for all total suspended particulate sampling associated with the Environmental Radiation Ambient Monitoring System (ERAMS). The ERAMS is comprised of a nationwide network of sampling stations that identify trends in the accumulation of long-lived radionuclides in the environment. Averaged gross beta TSP activity is presented in Figure 1., section 1.1.3 for SRS perimeter locations and illustrates trending of gross beta values for SCDHEC and DOE-SR. Routine weekly data for radiological total suspended particulates can be found in Section 1.1.4. The average gross beta concentration reported by SCDHEC in 2003 was 0.0195 pCi/m³.

Radiochemical Particulates

First quarter glass filters were analyzed for Pu-238, Pu-239/40, Am-241, Am-242, Am-243/244, U-234, U-235, and U-238. All analytical results for these radioisotopes were below minimum detectable activity or below the reporting limit of Severn Trent Laboratory (Richland, WA).

Ambient Beta/Gamma

SCDHEC conducts ambient beta and gamma monitoring through the deployment of TLDs around the perimeter of the SRS. During the sampling period, SCDHEC external radiation levels at monitored locations were higher than levels reported by DOE-SR. Ambient beta and gamma levels measured with TLDs are provided for all quarters of 2003 in Section 1.1.4. It should be noted that 4 millirems (mrem) are subtracted from each quarter's results to account for the transcontinental flight from South Carolina to California and back. Corrected values are reported in Section 1.1.4. The average ambient beta and gamma activity in 2003 was 25.14 mrems. Figure 2, section 1.1.3 shows trends at the SRS perimeter for averaged ambient beta and gamma values for DOE-SR and SCDHEC. SCDHEC averaged ambient beta and gamma values for 1999 and 2000 represent 3 quarters of data while all others represent 4 quarters.

Tritium

Tritium in air values reported by SCDHEC are the result of using the historical means of calculating an air concentration of tritium based on a generic absolute humidity of 11.5 grams of atmospheric moisture per cubic meter. Section 1.1.4 includes SCDHEC atmospheric moisture data analyzed in 2003. All analyses were below or slightly above the lower limit of detection (LLD). Averaged SCDHEC air tritium values were consistently lower than the DOE-SR measured values although well within the same order-of-magnitude and identical to the DOE-SR calculated value for air tritium at the SRS boundary. Tritium values reported by SCDHEC for 2003 were lower than for 2002. Figure 3, section 1.1.3 illustrates trending of atmospheric tritium values for SCDHEC and DOE-SR as measured and calculated at the SRS perimeter. The DOE-SR measured value for tritium in air at the SRS boundary was 14.0 pCi/m³ and the dose model

calculated value was 8.0 pCi/m³. The SCDHEC measured value was 4.8 pCi/m³. DOE-SR average measured values for tritium in atmospheric moisture were higher than SCDHEC averaged measured values for the SRS perimeter. This may be attributed to a dilution that occurs when desiccants are used for collecting atmospheric moisture for tritium analysis. In a recent study, tritium concentrations in air, as determined using desiccants, can result in underreporting of air tritium concentrations by factors of 1.4 to 2.6. Prior to deployment in the field, silica-gel desiccant is dried to remove any moisture. However, a small percentage of water remains in the desiccant. This results in a slight dilution of the collected sample, which is reflected in the distillate. DOE-SR has implemented a correction factor for tritium-in-air measurements using silica-gel. This could explain why 2003 DOE-SR measured values are higher than SCDHEC reported measured values. Another factor that may contribute to the lower SCDHEC air tritium values is that only two of the monitoring stations are exactly on the SRS perimeter (property line), while the other three points used for this comparison are located approximately two miles from the SRS property line. The majority of the analytical results for tritium in rainwater were below the LLD. The maximum reported value, 507 picocuries per liter from the New Ellenton, SC air monitoring station, was collected on October 7, 2003. Section 1.1.4 includes rainwater tritium data for all monitoring locations.

CONCLUSIONS / RECOMMENDATIONS

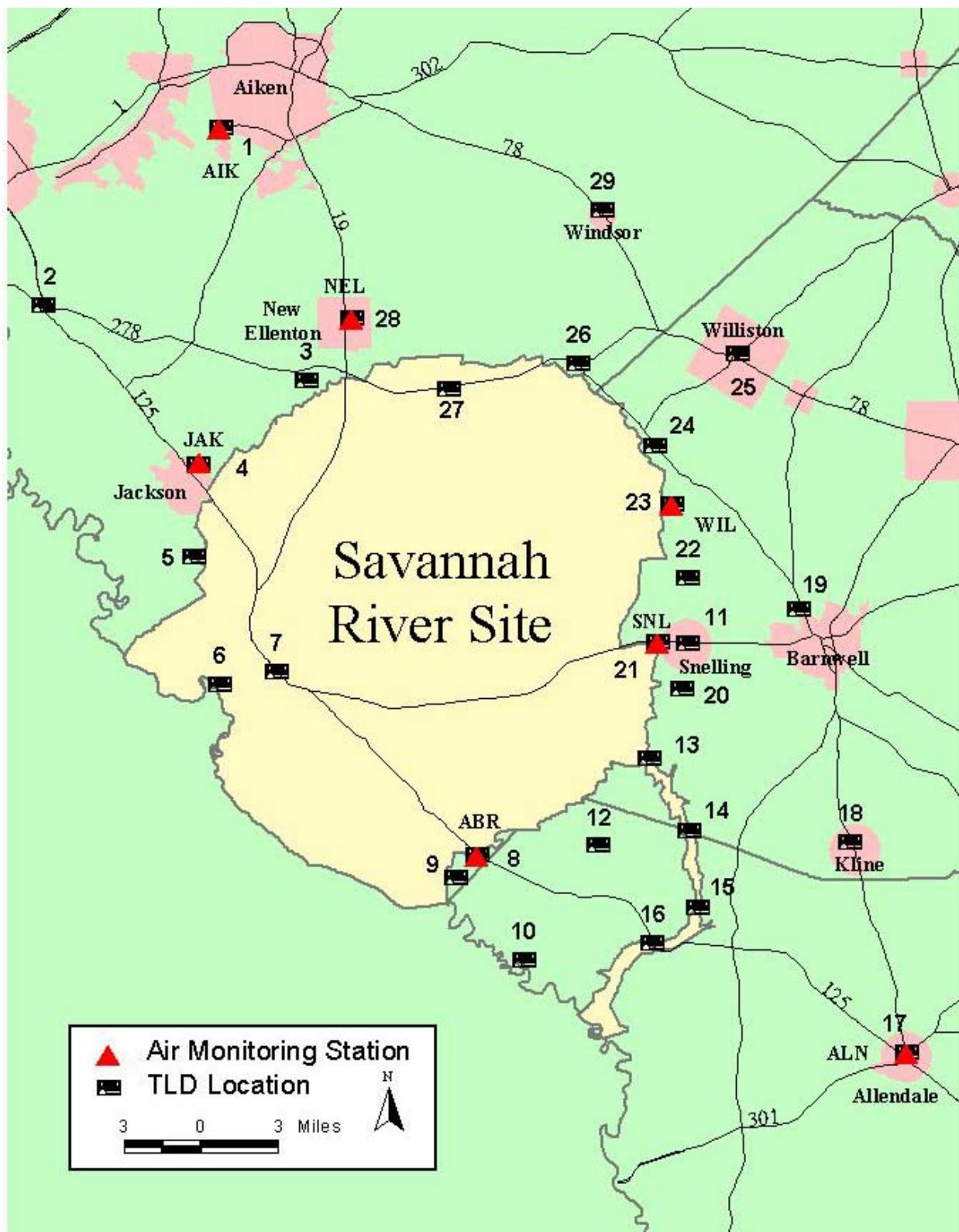
All SCDHEC data collected confirmed historically reported DOE-SR values for radionuclides in the ambient environment at the SRS boundary with no anomalous data noted for any monitored parameters.

SCDHEC air and precipitation tritium data were consistently lower than the DOE-SR measured values, although within the same order-of-magnitude. The states of South Carolina and Georgia, in conjunction with DOE-SR, are evaluating several ways to enhance tritium monitoring in the atmosphere.

The Environmental Surveillance Oversight Program is planning to install additional equipment in the winter of 2004-2005 and modify air tritium calculations to account for the residual moisture in the desiccant matrix to more precisely account for actual air tritium concentrations. No EPA air standards were exceeded at the monitored locations and there were no significant elevations of radiological pollutant concentrations associated with SRS operations. Sampling results by SCDHEC indicate that SRS activities did have a measurable but insignificant impact on local air quality.

1.1.2

Map 1. Radiological Atmospheric Monitoring Locations



1.1.3 Tables and Figures

Radiological Atmospheric Monitoring, 2003

Figure 1. Average Gross Beta for TSP at the SRS Perimeter.

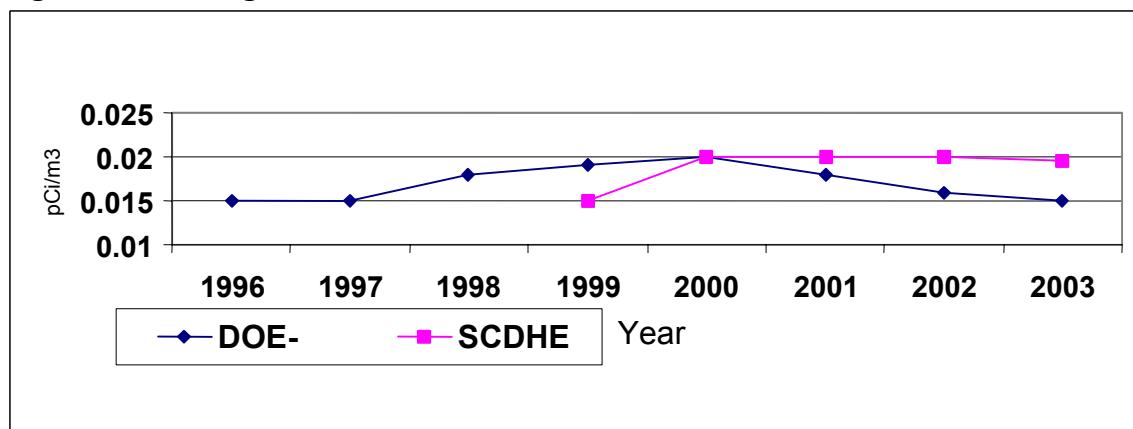


Figure 2. Average Ambient Beta/Gamma at the SRS Perimeter.

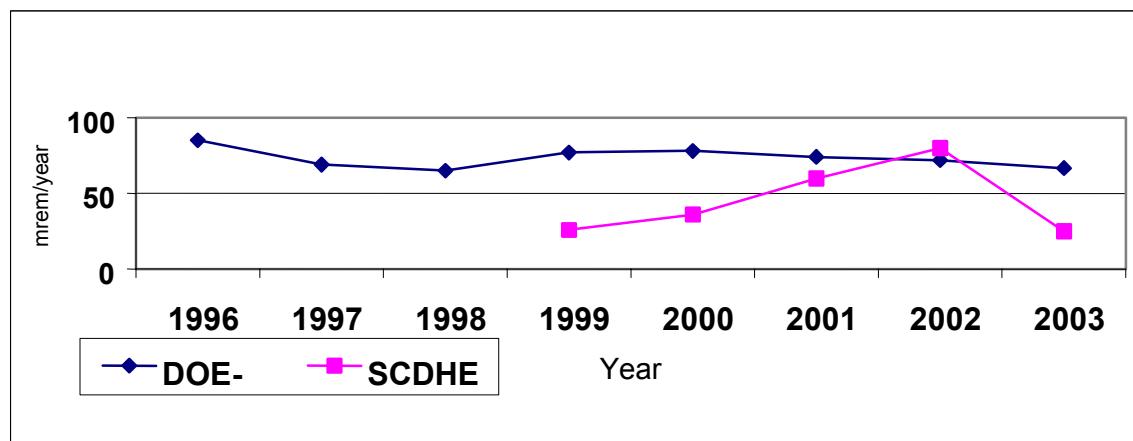
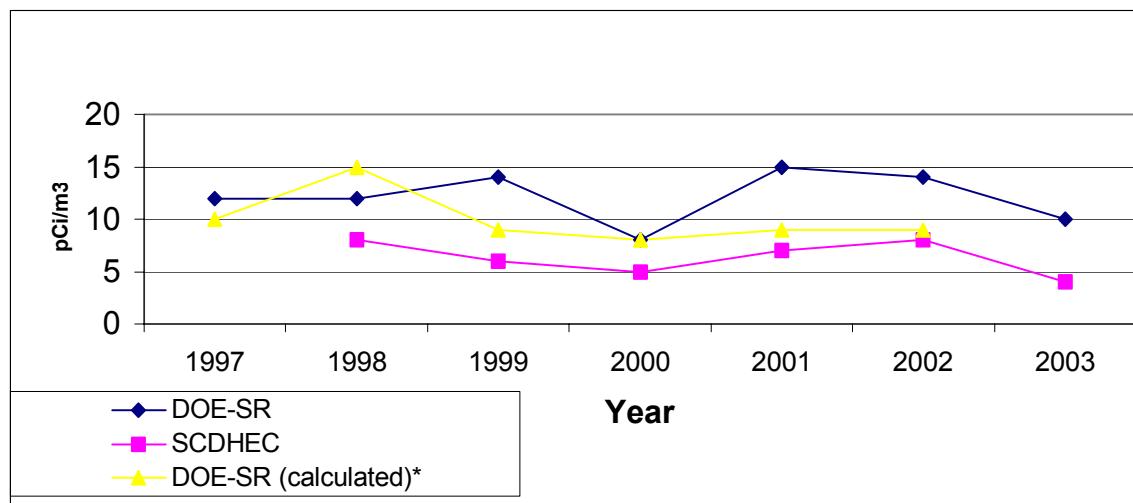


Figure 3. Average Atmospheric Tritium at the SRS Perimeter.



1.1.4 Data**Radiological Atmospheric Monitoring Data, 2003**

Routine Radiological Atmospheric Monitoring Data, 2003	17
Quarterly Atmospheric Ambient Beta/Gamma Data, 2003	24

Radiological Atmospheric Monitoring, 2003

Routine Atmospheric Monitoring Data

Sample Location:		Aiken Elementary Water Tower (AIK)						
Date	Gross Alpha in Air		Gross Beta in Air		Tritium in Air		Tritium in Rain	
	pCi/m ³	+- 2 sigma	pCi/m ³	+- 2 sigma	pCi/m ³	+- 2 sigma	pCi/L	+- 2 sigma
1/7/03	0.003	0.001	0.023	0.002				
1/14/03	0.003	0.001	0.027	0.002	<2.1		<184	
1/21/03	0.004	0.001	0.030	0.002				
1/28/03	0.002	0.001	0.022	0.002				
2/4/03	0.003	0.001	0.019	0.002				
2/11/03	0.002	0.001	0.018	0.002	<2.1		<187	
2/19/03	0.001	0.001	0.017	0.001				
2/25/03	0.001	0.001	0.016	0.002	3.30	1.10	<191	
3/4/03	0.003	0.001	0.014	0.001				
3/11/03	0.002	0.001	0.018	0.002				
3/18/03	0.002	0.001	0.018	0.002				
3/25/03	0.004	0.001	0.017	0.001	4.20	1.10	<174	
4/1/03	0.002	0.001	0.015	0.001				
4/8/03	0.002	0.001	0.014	0.001				
4/15/03	0.002	0.001	0.013	0.001				
4/22/03	0.003	0.001	0.016	0.002	3.20	1.00	<185	
4/29/03	0.002	0.001	0.013	0.001				
5/6/03	NS	NS	NS					
5/13/03	0.003	0.001	0.017	0.002				
5/20/03	0.002	0.001	0.018	0.002	5.20	1.00	<186	
5/27/03	0.001	0.001	0.013	0.001				
6/3/03	0.003	0.001	0.021	0.002				
6/10/03	0.004	0.001	0.014	0.002				
6/17/03	0.002	0.001	0.013	0.001	<2.2		<194	
6/24/03	0.002	0.001	0.012	0.001				
7/1/03	0.004	0.001	0.020	0.002				
7/8/03	0.003	0.001	0.010	0.001	4.00	1.10	<202	
7/15/03	0.002	0.001	0.012	0.001				
7/22/03	0.002	0.001	0.018	0.002				
7/30/03	0.002	0.001	0.012	0.001	<2.3		<203	
8/6/03	0.002	0.001	0.013	0.001				
8/12/03	0.002	0.001	0.017	0.002				
8/19/03	0.001	0.001	0.015	0.001	3.50	1.10	224.00	92.00
8/26/03	0.004	0.001	0.020	0.002				
9/2/03	0.002	0.001	0.017	0.002				
9/9/03	0.001	0.001	0.015	0.002	3.70	1.10	<194	
9/16/03	0.001	0.001	0.017	0.002				
9/23/03	0.010	0.001	0.027	0.002				
9/29/03	0.008	0.001	0.022	0.002				
10/7/03	0.011	0.001	0.032	0.002	6.00	1.20	<195	
10/15/03	0.007	0.001	0.019	0.002				
10/21/03	0.011	0.002	0.031	0.002				
10/28/03	0.010	0.001	0.025	0.002				
11/4/03	0.009	0.001	0.025	0.002	6.80	1.20	<186	
11/12/03	0.005	0.001	0.015	0.001				
11/18/03	0.005	0.001	0.017	0.002				
11/25/03	0.006	0.001	0.017	0.002				
12/2/03	0.006	0.001	0.022	0.002	4.80	1.10	<194	
12/9/03	0.005	0.001	0.017	0.002				
12/16/03	0.005	0.001	0.020	0.002				
12/22/03	0.005	0.001	0.019	0.002				
12/29/03	0.005	0.001	0.017	0.001				

Radiological Atmospheric Monitoring, 2003

Routine Atmospheric Monitoring Data

Sample Location:		New Ellenton, SC (NEL)						
Date	Gross Alpha in Air		Gross Beta in Air		Tritium in Air		Tritium in Rain	
	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/L	+ - 2 sigma
1/7/03	0.004	0.001	0.026	0.002				
1/14/03	0.004	0.001	0.026	0.002	3.00	1.00	<184	
1/21/03	0.003	0.001	0.035	0.002				
1/28/03	0.003	0.001	0.024	0.002				
2/4/03	0.002	0.001	0.021	0.002				
2/11/03	0.002	0.001	0.021	0.002	3.40	1.10	<187	
2/19/03	0.002	0.001	0.018	0.002				
2/25/03	0.001	0.001	0.017	0.002	26.10	1.80	<191	
3/4/03	0.004	0.001	0.015	0.002				
3/11/03	0.002	0.001	0.020	0.002				
3/18/03	0.002	0.001	0.019	0.002				
3/25/03	0.002	0.001	0.016	0.002	6.80	1.10	<174	
4/1/03	0.002	0.001	0.018	0.002				
4/8/03	0.002	0.001	0.015	0.002				
4/15/03	0.003	0.001	0.013	0.001				
4/22/03	0.003	0.001	0.017	0.002	4.00	1.10	<185	
4/29/03	NS		NS					
5/6/03	0.002	0.001	0.018	0.002				
5/13/03	0.004	0.001	0.018	0.002				
5/20/03	0.003	0.001	0.018	0.002	5.00	1.10	<186	
5/27/03	0.002	0.001	0.014	0.002				
6/3/03	0.003	0.001	0.022	0.002				
6/10/03	0.003	0.001	0.014	0.002				
6/17/03	0.002	0.001	0.014	0.002	5.10	1.10	271.00	93.00
6/24/03	0.003	0.001	0.013	0.002				
7/1/03	0.004	0.001	0.021	0.002				
7/8/03	0.003	0.001	0.012	0.002	5.20	1.20	<202	
7/15/03	0.002	0.001	0.013	0.002				
7/22/03	0.002	0.001	0.020	0.002				
7/30/03	0.002	0.001	0.015	0.002	<2.3		<202	
8/6/03	0.001	0.001	0.014	0.002				
8/12/03	0.002	0.001	0.016	0.002				
8/19/03	0.001	0.001	0.015	0.002	6.20	1.20	<198	
8/26/03	0.003	0.001	0.018	0.002				
9/2/03	0.002	0.001	0.016	0.002				
9/9/03	0.001	0.001	0.018	0.002	9.30	1.30	341.00	96.00
9/16/03	0.001	0.001	0.022	0.002				
9/23/03	0.012	0.002	0.031	0.002				
9/29/03	0.009	0.001	0.023	0.002				
10/7/03	0.013	0.002	0.034	0.002	3.70	1.10	507.00	103.00
10/15/03	0.001	0.001	0.022	0.002				
10/21/03	0.012	0.002	0.039	0.003				
10/28/03	0.011	0.001	0.030	0.002				
11/4/03	0.007	0.001	0.028	0.002	6.70	1.20	<186	
11/12/03	0.005	0.001	0.017	0.002				
11/18/03	0.007	0.001	0.021	0.002				
11/25/03	0.006	0.001	0.020	0.002				
12/2/03	0.007	0.001	0.024	0.002	8.50	1.30	<194	
12/9/03	0.006	0.001	0.022	0.002				
12/16/03	0.006	0.001	0.024	0.002				
12/22/03	0.004	0.001	0.020	0.002				
12/29/03	0.005	0.001	0.021	0.002				

Radiological Atmospheric Monitoring, 2003

Routine Atmospheric Monitoring Data

Sample Location:		Jackson, SC (JAK)						
Date	Gross Alpha in Air		Gross Beta in Air		Tritium in Air		Tritium in Rain	
	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/L	+ - 2 sigma
1/7/03	0.004	0.001	0.030	0.003				
1/14/03	0.004	0.001	0.028	0.002	<2.1		<184	
1/21/03	0.004	0.001	0.033	0.002				
1/28/03	0.003	0.001	0.024	0.002				
2/4/03	0.003	0.001	0.022	0.002				
2/11/03	0.002	0.001	0.020	0.002	8.80	1.30	<187	
2/19/03	0.002	0.001	0.018	0.002				
2/25/03	0.002	0.001	0.015	0.002	3.00	1.10	<191	
3/4/03	0.003	0.001	0.014	0.001				
3/11/03	0.003	0.001	0.020	0.002				
3/18/03	0.002	0.001	0.018	0.002				
3/25/03	0.001	0.001	0.016	0.002	6.30	1.10	<174	
4/1/03	0.002	0.001	0.017	0.002				
4/8/03	0.002	0.001	0.016	0.002				
4/15/03	0.003	0.001	0.015	0.001				
4/22/03	0.003	0.001	0.018	0.002	4.00	1.10	<185	
4/29/03	NS	NS						
5/6/03	0.002	0.001	0.021	0.002				
5/13/03	0.003	0.001	0.017	0.002				
5/20/03	0.002	0.001	0.017	0.002	4.50	1.10	225.00	88.00
5/27/03	0.001	0.001	0.014	0.002				
6/3/03	0.003	0.001	0.022	0.002				
6/10/03	0.003	0.001	0.015	0.002				
6/17/03	0.002	0.001	0.014	0.002	<2.2		<194	
6/24/03	0.003	0.001	0.013	0.002				
7/1/03	0.004	0.001	0.022	0.002				
7/8/03	0.002	0.001	0.012	0.001	3.30	1.10	<202	
7/15/03	0.003	0.001	0.011	0.002				
7/22/03	0.002	0.001	0.021	0.002				
7/30/03	0.002	0.001	0.014	0.001	4.70	1.20	<202	
8/6/03	0.002	0.001	0.013	0.002				
8/12/03	0.002	0.001	0.017	0.002				
8/19/03	0.001	0.001	0.014	0.002	11.10	1.40	<198	
8/26/03	0.003	0.001	0.020	0.002				
9/2/03	0.002	0.001	0.018	0.002				
9/9/03	0.001	0.001	0.015	0.002	5.50	1.20	<194	
9/16/03	0.001	0.001	0.021	0.002				
9/23/03	0.011	0.002	0.029	0.002				
9/29/03	0.011	0.001	0.026	0.002				
10/7/03	0.013	0.002	0.038	0.002	10.70	1.40	<195	
10/15/03	0.001	0.001	0.021	0.002				
10/21/03	0.012	0.002	0.034	0.003				
10/28/03	0.010	0.002	0.029	0.002				
11/4/03	0.009	0.001	0.030	0.002	9.70	1.30	218.00	88.00
11/12/03	0.006	0.001	0.019	0.002				
11/18/03	0.007	0.001	0.020	0.002				
11/25/03	0.006	0.001	0.020	0.002				
12/2/03	0.007	0.001	0.024	0.002	5.60	1.20	<194	
12/9/03	0.007	0.001	0.024	0.002				
12/16/03	0.008	0.001	0.031	0.002				
12/22/03	0.005	0.001	0.018	0.002				
12/29/03	0.005	0.001	0.021	0.002				

Radiological Atmospheric Monitoring, 2003

Routine Atmospheric Monitoring Data

Sample Location:		Allendale Barricade (ABR)						
Date	Gross Alpha in Air		Gross Beta in Air		Tritium in Air		Tritium in Rain	
	pCi/m ³	+- 2 sigma	pCi/m ³	+- 2 sigma	pCi/m ³	+- 2 sigma	pCi/L	+- 2 sigma
1/7/03	0.003	0.001	0.022	0.002				
1/14/03	0.004	0.001	0.028	0.002	<2.1		<184	
1/21/03	0.003	0.001	0.034	0.002				
1/28/03	0.003	0.001	0.026	0.002				
2/4/03	0.004	0.001	0.023	0.002				
2/11/03	0.002	0.001	0.020	0.002	6.10	1.20	<187	
2/19/03	0.002	0.001	0.018	0.002				
2/25/03	<.001		0.016	0.002	4.20	1.10	<191	
3/4/03	0.003	0.001	0.015	0.001				
3/11/03	0.002	0.001	0.017	0.002				
3/18/03	0.002	0.001	0.017	0.002				
3/25/03	0.001	0.001	0.015	0.002	5.80	1.10	<174	
4/1/03	0.002	0.001	0.020	0.002				
4/8/03	0.002	0.001	0.014	0.001				
4/15/03	0.002	0.001	0.013	0.001				
4/22/03	0.003	0.001	0.017	0.002	3.10	1.00	<185	
4/29/03	0.001	0.001	0.013	0.001				
5/6/03	0.002	0.001	0.019	0.002				
5/13/03	0.003	0.001	0.018	0.002				
5/20/03	0.003	0.001	0.019	0.002	2.50	1.00	<186	
5/27/03	0.002	0.001	0.012	0.001				
6/3/03	0.003	0.001	0.022	0.002				
6/10/03	0.002	0.001	0.015	0.002				
6/17/03	0.002	0.001	0.013	0.001	4.10	1.10	<194	
6/24/03	0.003	0.001	0.012	0.001				
7/1/03	0.003	0.001	0.020	0.002				
7/8/03	0.002	0.001	0.012	0.001	<2.3		<202	
7/15/03	0.002	0.001	0.013	0.002				
7/22/03	0.003	0.001	0.019	0.002				
7/30/03	0.002	0.001	0.014	0.001	<2.3		<203	
8/6/03	0.001	0.001	0.013	0.002				
8/12/03	0.002	0.001	0.015	0.002				
8/19/03	0.002	0.001	0.014	0.002	<2.3		<198	
8/26/03	0.002	0.001	0.014	0.002				
9/2/03	0.003	0.001	0.015	0.002				
9/9/03	0.001	0.001	0.014	0.002	<2.2		<194	
9/16/03	0.001	0.001	0.017	0.002				
9/23/03	0.014	0.002	0.032	0.002				
9/29/03	0.008	0.001	0.023	0.002				
10/7/03	0.001	0.001	0.023	0.002	2.40	1.10	<195	
10/15/03	0.001	0.001	0.023	0.002				
10/21/03	0.011	0.002	0.040	0.003				
10/28/03	0.010	0.002	0.029	0.002				
11/4/03	0.009	0.001	0.028	0.002	3.00	1.10	<186	
11/12/03	0.006	0.001	0.016	0.002				
11/18/03	0.006	0.001	0.019	0.002				
11/25/03	0.007	0.001	0.018	0.002				
12/2/03	0.008	0.001	0.026	0.002	4.70	1.10	<194	
12/9/03	0.005	0.001	0.021	0.002				
12/16/03	0.006	0.001	0.023	0.002				
12/22/03	0.008	0.001	0.021	0.002				
12/29/03	0.006	0.001	0.023	0.002				

Radiological Atmospheric Monitoring, 2003

Routine Atmospheric Monitoring Data

Sample Location:		Allendale, SC (ALN)						
Date	Gross Alpha in Air		Gross Beta in Air		Tritium in Air		Tritium in Rain	
	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/L	+ - 2 sigma
1/7/03	0.003	0.001	0.024	0.002				
1/14/03	0.003	0.001	0.027	0.002	<2.1		<184	
1/21/03	0.004	0.001	0.033	0.002				
1/28/03	0.003	0.001	0.025	0.002				
2/4/03	0.003	0.001	0.022	0.002				
2/11/03	0.002	0.001	0.022	0.002	<2.2		207.00	1.00
2/19/03	0.002	0.001	0.018	0.002				
2/25/03	0.001	0.001	0.015	0.002	<2.2		<191	
3/4/03	0.004	0.001	0.015	0.001				
3/11/03	0.003	0.001	0.018	0.002				
3/18/03	0.003	0.001	0.018	0.002				
3/25/03	0.002	0.001	0.016	0.002	3.40	1.00	<174	
4/1/03	0.002	0.001	0.016	0.001				
4/8/03	0.002	0.001	0.017	0.002				
4/15/03	0.003	0.001	0.015	0.001				
4/22/03	0.004	0.001	0.019	0.002	2.70	1.00	<185	
4/29/03	0.002	0.001	0.014	0.002				
5/6/03	0.002	0.001	0.017	0.002				
5/13/03	0.003	0.001	0.018	0.002				
5/20/03	0.002	0.001	0.013	0.001	<2.1		<186	
5/27/03	0.002	0.001	0.013	0.001				
6/3/03	0.003	0.001	0.023	0.002				
6/10/03	0.003	0.001	0.016	0.002				
6/17/03	0.002	0.001	0.013	0.001	<2.2		<194	
6/24/03	0.003	0.001	0.011	0.001				
7/1/03	0.004	0.001	0.020	0.002				
7/8/03	0.002	0.001	0.010	0.001	<2.3		<202	
7/15/03	0.001	0.001	0.011	0.001				
7/22/03	0.002	0.001	0.018	0.002				
7/30/03	0.001	0.001	0.013	0.001	<2.3		<203	
8/6/03	0.002	0.001	0.013	0.001				
8/12/03	0.002	0.001	0.015	0.002				
8/19/03	0.001	0.001	0.012	0.001	<2.3		<198	
8/26/03	0.001	0.001	0.015	0.002				
9/2/03	0.002	0.001	0.014	0.002				
9/9/03	0.001	0.001	0.014	0.002	<2.2		<194	
9/16/03	0.001	0.001	0.017	0.002				
9/23/03	0.010	0.002	0.028	0.002				
9/29/03	0.007	0.001	0.023	0.002				
10/7/03	0.010	0.002	0.038	0.002	<2.2		<195	
10/15/03	0.007	0.001	0.020	0.002				
10/21/03	0.012	0.002	0.030	0.002				
10/28/03	0.009	0.001	0.025	0.002				
11/4/03	0.009	0.001	0.025	0.002	6.50	1.20	187.00	86.00
11/12/03	0.005	0.001	0.015	0.001				
11/18/03	0.006	0.001	0.021	0.002				
11/25/03	0.006	0.001	0.019	0.002				
12/2/03	0.008	0.001	0.024	0.002	3.30	1.10	<194	
12/9/03	0.006	0.001	0.021	0.002				
12/16/03	0.007	0.001	0.025	0.002				
12/22/03	0.007	0.001	0.024	0.002				
12/29/03	0.006	0.001	0.024	0.002				

Radiological Atmospheric Monitoring, 2003

Routine Atmospheric Monitoring Data

Sample Location:		Snelling, SC (SNL)						
Date	Gross Alpha in Air		Gross Beta in Air		Tritium in Air		Tritium in Rain	
	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/L	+ - 2 sigma
1/7/03	0.004	0.001	0.025	0.002				
1/14/03	0.004	0.001	0.025	0.002	8.10	1.20	<184	
1/21/03	0.003	0.001	0.032	0.002				
1/28/03	0.002	0.001	0.024	0.002				
2/4/03	0.003	0.001	0.019	0.002				
2/11/03	0.002	0.001	0.019	0.002	8.40	1.20	<187	
2/19/03	0.002	0.001	0.017	0.001				
2/25/03	0.002	0.001	0.016	0.002	8.60	1.30	<191	
3/4/03	0.005	0.001	0.017	0.002				
3/11/03	0.002	0.001	0.019	0.002				
3/18/03	0.002	0.001	0.019	0.002				
3/25/03	0.002	0.001	0.017	0.002	7.30	1.20	<174	
4/1/03	0.002	0.001	0.019	0.002				
4/8/03	0.002	0.001	0.016	0.002				
4/15/03	0.003	0.001	0.014	0.001				
4/22/03	0.003	0.001	0.018	0.002	5.80	1.10	<185	
4/29/03	0.001	0.001	0.013	0.001				
5/6/03	0.002	0.001	0.018	0.002				
5/13/03	0.003	0.001	0.018	0.002				
5/20/03	0.002	0.001	0.012	0.001	3.90	1.10	<186	
5/27/03	0.002	0.001	0.012	0.001				
6/3/03	0.002	0.001	0.022	0.002				
6/10/03	0.003	0.001	0.016	0.002				
6/17/03	0.003	0.001	0.012	0.001	3.60	1.10	<194	
6/24/03	0.002	0.001	0.012	0.002				
7/1/03	0.004	0.001	0.022	0.002				
7/8/03	0.002	0.001	0.011	0.001	2.90	1.10	<202	
7/15/03	0.002	0.001	0.011	0.001				
7/22/03	0.002	0.001	0.020	0.002				
7/30/03	0.002	0.001	0.012	0.001	2.50	1.10	<203	
8/6/03	0.002	0.001	0.013	0.001				
8/12/03	0.002	0.001	0.017	0.002				
8/19/03	0.001	0.001	0.013	0.002	<2.3		<198	
8/26/03	0.002	0.001	0.016	0.002				
9/2/03	0.002	0.001	0.015	0.002				
9/9/03	0.001	0.001	0.014	0.002	<2.2		<194	
9/16/03	0.001	0.001	0.018	0.002				
9/23/03	0.012	0.002	0.029	0.002				
9/29/03	0.008	0.001	0.028	0.002				
10/7/03	0.014	0.002	0.031	0.002	4.40	1.10	<195	
10/15/03	0.007	0.001	0.020	0.002				
10/21/03	0.011	0.002	0.031	0.002				
10/28/03	0.010	0.001	0.030	0.002				
11/4/03	0.008	0.001	0.026	0.002	2.70	1.10	<186	
11/12/03	0.004	0.001	0.018	0.002				
11/18/03	0.005	0.001	0.020	0.002				
11/25/03	0.004	0.001	0.018	0.002				
12/2/03	0.008	0.001	0.023	0.002	8.20	1.30	<194	
12/9/03	0.005	0.001	0.019	0.002				
12/16/03	0.007	0.001	0.024	0.002				
12/22/03	0.005	0.001	0.022	0.002				
12/29/03	0.006	0.001	0.023	0.002				

Radiological Atmospheric Monitoring, 2003

Routine Atmospheric Monitoring Data

Sample Location:		Williston, SC (WIL)						
Date	Gross Alpha in Air		Gross Beta in Air		Tritium in Air		Tritium in Rain	
	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/m ³	+ - 2 sigma	pCi/L	+ - 2 sigma
1/7/03	0.003	0.001	0.026	0.002				
1/14/03	0.004	0.001	0.031	0.002	8.60	1.20	<184	
1/21/03	0.004	0.001	0.038	0.002				
1/28/03	<.001		0.039	0.001				
2/4/03	0.002	0.001	0.022	0.003				
2/11/03	0.002	0.001	0.022	0.002	12.00	1.40	<187	
2/19/03	0.002	0.001	0.020	0.002				
2/25/03	<.002		0.025	0.004	3.60	1.10	<191	
3/4/03	0.004	0.001	0.017	0.002				
3/11/03	0.003	0.001	0.020	0.002				
3/18/03	0.004	0.001	0.020	0.002				
3/25/03	0.001	0.002	0.016	0.004	3.90	1.00	<174	
4/1/03	0.002	0.001	0.017	0.002				
4/8/03	0.001	0.001	0.017	0.002				
4/15/03	0.003	0.001	0.013	0.002				
4/22/03	0.004	0.001	0.018	0.002	6.20	1.20	<185	
4/29/03	0.002	0.001	0.015	0.002				
5/6/03	0.002	0.001	0.018	0.002				
5/13/03	0.004	0.001	0.019	0.002				
5/20/03	0.004	0.001	0.024	0.003	4.60	1.10	<186	
5/27/03	0.002	0.001	0.015	0.002				
6/3/03	0.003	0.001	0.025	0.002				
6/10/03	0.002	0.001	0.014	0.002				
6/17/03	0.001	0.001	0.014	0.002	3.40	1.10	<194	
6/24/03	0.003	0.001	0.011	0.002				
7/1/03	0.005	0.001	0.021	0.003				
7/8/03	0.002	0.001	0.011	0.002	3.40	1.10	<202	
7/15/03	0.003	0.001	0.013	0.002				
7/22/03	<.001		0.020	0.004				
7/30/03	0.001	0.001	0.011	0.001	5.00	1.20	<203	
8/6/03	0.003	0.002	0.019	0.004				
8/12/03	0.003	0.001	0.017	0.002				
8/19/03	0.002	0.001	0.016	0.002	6.00	1.20	<198	
8/26/03	0.003	0.001	0.021	0.002				
9/2/03	0.003	0.001	0.018	0.002				
9/9/03	0.001	0.001	0.018	0.002	<2.2		<194	
9/16/03	0.001	0.001	0.025	0.002				
9/23/03	0.013	0.002	0.034	0.003				
9/29/03	0.010	0.001	0.029	0.002				
10/7/03	0.013	0.002	0.040	0.003	3.20	1.10	<195	
10/15/03	0.010	0.002	0.024	0.002				
10/21/03	0.014	0.002	0.038	0.003				
10/28/03	0.011	0.002	0.033	0.002				
11/4/03	0.011	0.002	0.033	0.002	4.30	1.10	<186	
11/12/03	0.007	0.001	0.020	0.002				
11/18/03	0.007	0.002	0.025	0.002				
11/25/03	0.007	0.001	0.024	0.002				
12/2/03	0.009	0.002	0.030	0.002	6.40	1.20	272.00	93.00
12/9/03	0.008	0.001	0.025	0.002				
12/16/03	0.006	0.001	0.024	0.002				
12/22/03	0.006	0.001	0.022	0.002				
12/29/03	0.005	0.001	0.022	0.002				

Radiological Atmospheric Monitoring, 2003
Quarterly Atmospheric Ambient Beta/Gamma Data

Sample Location	Map ID #	Quarter 1	Quarter 2	Quarter 3	Quarter 4
		mrem	mrem	mrem	mrem
Colocated with Aiken Air Station	1	22	22	21	23
Beech Island First Citizens Bank	2	28	26	27	30
Green Pond	3	23	26	24	23
Colocated with Jackson Air Station	4	23	22	22	22
Crackerneck Gate	5	28	26	26	31
TNX Boat Ramp	6	31	28	29	33
Junction of Road 3 and US 125	7	22	22	20	23
Colocated with Allendale Barricade	8	22	20	21	21
Vogtle Warning Pole	9	21	22	19	MT
Little Hell Boat Ramp	10	22	21	MT	22
Moore's Store	11	22	22	21	20
Junction of Millet Road and Round Tree Road	12	28	27	26	28
Patterson Mill road At Lower Three runs creek	13	28	28	24	28
Stenson Bridge at Lower Three runs creek	14	35	31	29	30
Rockey Point at Lower Three runs creek	15	32	MT	27	MT
US 125 At Lower Three runs creek	16	27	28	27	28
Co-located with Allendale Air station	17	25	23	24	24
Kline	18	29	27	23	30
Barnwell Airport	19	24	26	24	27
Junction CR 54 andCR 857	20	23	23	22	23
Colocated with Snelling Air station	21	26	25	25	30
Junction of CR 21 and CR 166	22	21	25	22	26
Colocated with Williston Air station	23	23	25	24	26
Bates cemetery	24	24	21	23	25
Williston Police Department	25	28	24	24	27
Junction of US 278 and SC 781	26	26	25	22	26
US 278 near Upper Three Runs Creek	27	30	28	28	32
Colocated with New Ellenton Air Station	28	26	24	23	27
Winsor Post Office	29	24	23	24	25

Notes:

MT-Missing TLD

1.1.5 Summary Statistics

Radiological Atmospheric Monitoring, 2003

Statistical Review Of Radiological Monitoring at Aiken Elementary Water Tower (AIK)

	Gross Alpha	Gross Beta	Tritium in Air	Tritium in Rain
Mean	0.004	0.018	3.50	104.79
Std Dev	0.003	0.005	1.88	34.51
Median	0.003	0.017	3.60	97.00
Min	0.001	0.010	1.05	87.00
Max	0.011	0.032	6.80	224.00

Statistical Review Of Radiological Monitoring at New Ellenton, SC (NEL)

	Gross Alpha	Gross Beta	Tritium in Air	Tritium in rain
Mean	0.004	0.020	6.73	154.89
Std Dev	0.003	0.006	5.99	127.46
Median	0.003	0.019	5.15	97.00
Min	0.001	0.012	1.15	87.00
Max	0.013	0.039	26.10	507.00

Statistical Review Of Radiological Monitoring at Jackson, SC (JAK)

	Gross Alpha	Gross Beta	Tritium in Air	Tritium in rain
Mean	0.004	0.020	5.67	113.79
Std Dev	0.003	0.006	3.30	45.81
Median	0.003	0.020	5.10	97.00
Min	0.001	0.011	1.05	87.00
Max	0.013	0.038	11.10	225.00

Statistical Review Of Radiological Monitoring at Allendale Barricade (ABR)

	Gross Alpha	Gross Beta	Tritium in Air	Tritium in rain
Mean	0.004	0.019	2.96	94.74
Std Dev	0.003	0.006	1.78	5.19
Median	0.003	0.018	2.75	96.25
Min	0.001	0.012	1.05	82.50
Max	0.014	0.040	6.10	101.50

Statistical Review Of Radiological Monitoring at Allendale, SC (ALN)

	Gross Alpha	Gross Beta	Tritium in Air	Tritium in rain
Mean	0.004	0.019	1.93	110.64
Std Dev	0.003	0.006	1.58	36.98
Median	0.003	0.018	1.13	97.00
Min	0.001	0.010	1.05	87.00
Max	0.012	0.038	6.50	207.00

Statistical Review Of Radiological Monitoring at Snelling, SC (SNL)

	Gross Alpha	Gross Beta	Tritium in Air	Tritium in rain
Mean	0.004	0.019	4.90	95.39
Std Dev	0.003	0.006	2.77	3.99
Median	0.003	0.018	4.15	96.25
Min	0.001	0.011	1.10	87.00
Max	0.014	0.032	8.60	101.50

2.1 Ambient Groundwater Quality Adjacent to SRS

2.1.1 Summary

The Environmental Surveillance and Oversight Program's (ESOP) Ambient Groundwater Quality Monitoring Project samples and evaluates an ambient groundwater quality-monitoring network ("network") adjacent to the Savannah River Site (SRS). The network is comprised of existing groundwater wells owned by various government agencies, businesses, and members of the public.

The study area includes SRS and a 10-mile perimeter from the SRS boundary in South Carolina. ESOP evaluates five aquifer zones within the study area from the shallow water table to confined aquifers more than 1200 feet deep. The network is sampled on a five-year cycle. In 2003, ESOP sampled 36 wells from the central, northwestern, and eastern portions of the study area (Map 2, Section 2.1.2). ESOP analyzed filtered and non-filtered ground water for basic water quality parameters, metals, volatile organic compounds, pesticides, polychlorinated biphenyls', tritium, alpha-emitting, beta-emitting, and gamma-emitting radioisotopes.

A review of the analytical data (Section 2.2.4) revealed several wells with contaminants in excess of the United States Environmental Protection Agency (USEPA) Maximum Contaminant Level (MCL).

RESULTS AND DISCUSSION

A review of the analytical data revealed various constituents were detected in 31 wells sampled. Six of the 36 wells contained contaminants in excess of the EPA MCL for lead, gross non-volatile beta, and radium-226/228 (Table 1, section 2.1.3). Lead was detected in two wells above the 0.015 milligrams per liter (mg/L) "action level". Gross non-volatile beta was detected in two wells above the 4 millirems per year (mrems/yr) or 8 picocuries per liter (pCi/L) drinking water MCL. Radium-226/228 (combined) was detected in two wells above the 5pCi/L drinking water MCL.

As the SRS collects groundwater samples from a different monitoring well network, direct comparisons could not be made to the findings (i.e., detectable levels of tritium and some chlorinated solvents) in the latest DOE-SR report. However, the 2003 network results tend to support DOE-SR findings that radiological and non-radiological contaminants associated with SRS activities have not migrated off-site via groundwater. Analytical results are summarized in Section 2.1.4.

Metals

The presence of metals in the environment can be attributed to man-made processes and/or the natural decay process. With the exception of lead, a review of the following metal contaminants detected indicates that their presence is most likely due to the erosion of natural deposits.

Lead was detected at a concentration of 0.038 mg/L and 0.027 mg/L in wells M02205 and P-17TC respectively. The MCL for lead is 0.015 mg/L. Based upon the SRS general groundwater flow direction and the hydraulically up-gradient distance of M02205 and P-17TC from SRS process areas, it is unlikely that this contaminant is related to SRS activities. As the natural occurrence of lead is rare, the lead concentration in this well is probably due to the corrosion of well construction material or formation chemistry interactions.

Barium was detected at concentrations of 0.083 mg/L, 0.066 mg/L, and 0.069 mg/L in wells P-24, P-23TC, and P-26TC, respectively. The MCL for barium is 2 mg/L. These clusters are in the vicinity of P-area, K-area, and D-area respectively.

Cadmium was detected at concentrations of 0.0002 mg/L, 0.0006 mg/L, 0.0005 mg/L, 0.0003 mg/L, and 0.0001 mg/L in wells P-29TD, FC-2D, M02104, M02306, and M02303 respectively. P-29TD and FC-2D are in the vicinity of B-area and F-area, respectively. The MCL for cadmium is 0.005 mg/L. Based upon SRS's general groundwater flow direction and the hydraulically up-gradient distance of M02104, M02306, and M02303 from SRS's site boundary, it is unlikely that this contaminant is related to SRS activities.

Selenium was detected at a concentration of 0.0029 mg/L in well M06502. The MCL for selenium is 0.050 mg/L. Based upon the SRS general groundwater flow direction and the hydraulically up-gradient distance of M06502 from the SRS boundary, it is unlikely that this contaminant is related to SRS activities.

Copper was detected at a concentration of 0.012 mg/L in well M06503. The MCL for copper is 1.3 mg/L. Based upon SRS's general groundwater flow direction and the hydraulically up-gradient distance of M06503 from SRS's site boundary, it is unlikely that this contaminant is related to SRS activities.

Anions

Nitrate was detected at concentrations well below the 10 mg/L MCL in 18 monitoring wells. The presence of nitrate is most likely due to the erosion of natural deposits and/or runoff from fertilizer use. Once in the soil, nitrate is very mobile due to its water solubility trait and therefore moves easily through the soil matrix at a speed comparable to water.

Nitrite was detected at a concentration of 0.021 mg/L in well M06501. The MCL for nitrite is 1 mg/L. The presence of nitrite is most likely due to the erosion of natural deposits and/or runoff from fertilizer use. Once in the soil, nitrite is very mobile due to its water solubility trait and therefore moves easily through the soil matrix at a speed comparable to water.

Fluoride was detected at concentrations of 0.15 mg/L, 0.11 mg/L, 0.18 mg/L, and 0.16 mg/L in wells FC-2D, M06502, M06503, and M06504 respectively. The MCL for fluoride is 4 mg/L. The presence of fluoride is most likely due to the erosion of natural deposits.

Radionuclides

Gross alpha was detected at concentrations below the 15 pCi/L MCL in 12 monitoring wells. As the presence of naturally occurring radionuclides has been well documented in the groundwater regime across the state, the concentrations of gross alpha are probably due to the natural decay process of uranium deposits within the subsurface.

Gross non-volatile beta was detected in 9 monitoring wells. Two of those wells contained concentrations in excess of the 4 mrem/yr or 8 pCi/L MCL. Concentrations of 16.4 pCi/L and 19.5 pCi/L were detected in M02204 and M02305 respectively. The concentration detected in M02204 could be attributed to a combination of various beta-emitting particles (i.e., radium-228, tritium, etc.). SCDHEC's tritium Minimum Detectable Activity (MDA) limits were too high to quantify the exact amount of tritium present in the wells. In addition, no speciation was performed on the sample water.

Tritium was detected at concentrations well below the 20,000 pCi/L MCL in four monitoring wells. Concentrations of 335 pCi/L, 227 pCi/L, 679 pCi/L, and 1,060 pCi/L were detected in M02202, FC-2C, P-16B, and FC-2D respectively. Tritium is produced naturally in the upper atmosphere when cosmic rays strike air molecules. Tritium is also produced during nuclear weapons explosions, as a by-product in reactors producing electricity, and in special production reactors, where the isotope lithium-6 is bombarded to produce tritium. Tritium samples were collected from the South Carolina Department of Natural Resources' well cluster C-5 in 2003 and results were less than the MDA (<190 pCi/L). Based upon SRS's general groundwater flow direction and the hydraulically up-gradient distance of C-05 from the SRS boundary, this cluster is considered a background location. Therefore, the tritium concentrations mentioned above are probably attributed to a combination of cosmic, aboveground nuclear testing, and SRS activities.

Various combinations of uranium, radium-226, radium-228, and radium 226/228 were detected at concentrations \geq 1.0 pCi/L or \geq 1.0 ug/L (for uranium) in 16 monitoring wells. Two of those wells contained concentrations in excess of the 5 pCi/L MCL for radium 226/228 (combined). Concentrations of 6.01 pCi/L and 5.38 pCi/L were detected in wells P-30TC and P-17TA respectively. Uranium was detected at a concentration of 1.79 ug/L in M06501, which is well below the 30 ug/L MCL. Ra-226 was detected at concentrations below the 5 pCi/L MCL in eight monitoring wells. Radium-228 was detected at concentrations below the 5 pCi/L MCL in sixteen monitoring wells. As the presence of naturally occurring radionuclides (i.e., uranium, radium 226/228) has been well documented in the groundwater regime across the state, the concentrations of uranium, radium 226, and radium 228 are probably due to the natural decay process of uranium deposits within the subsurface. This information will be shared with other SCDHEC programs for tracking and public awareness purposes.

CONCLUSIONS / RECOMMENDATIONS

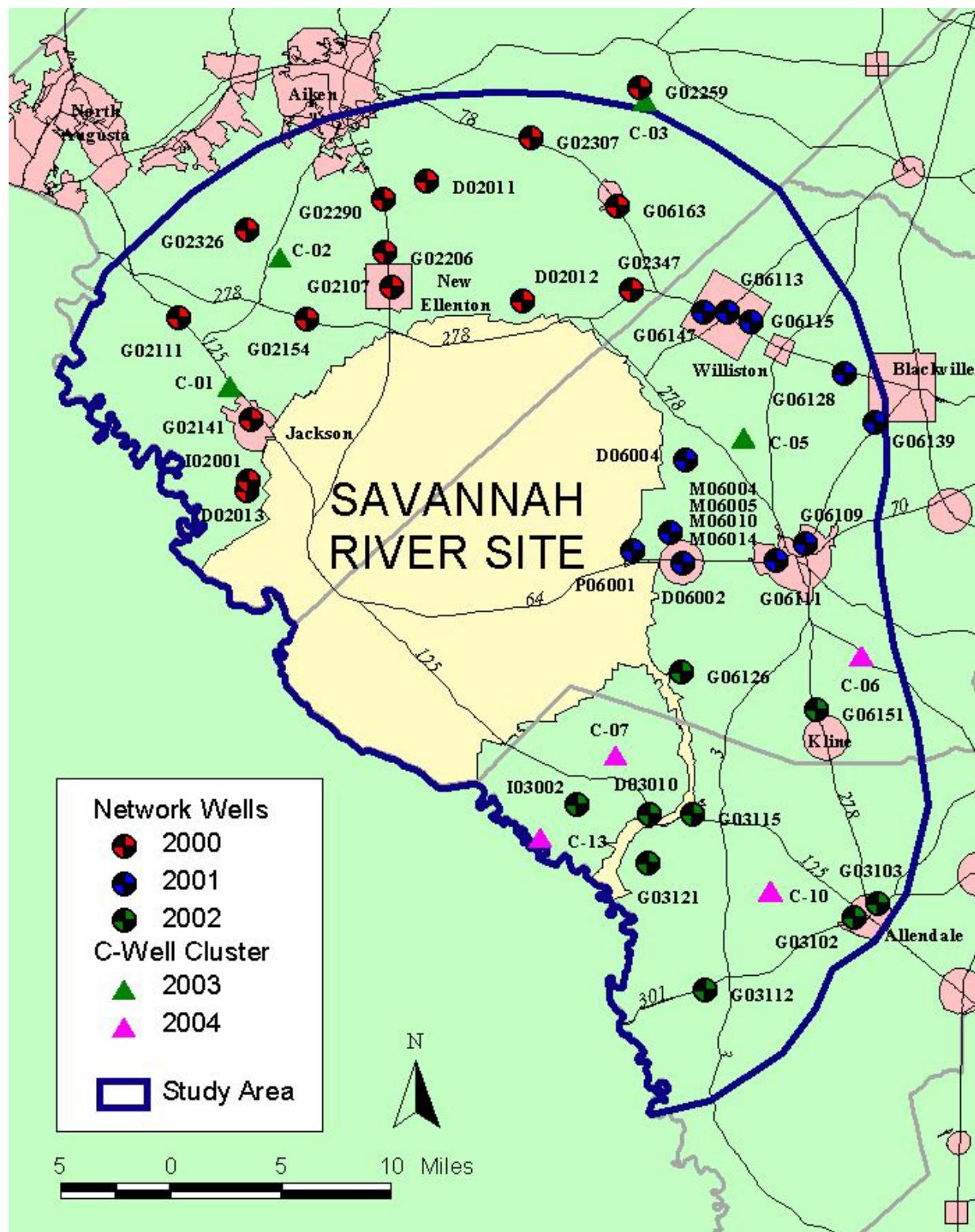
A review of the analytical data revealed various constituents present in 31 wells sampled. Six of the 31 wells contained contaminants in excess of the EPA MCL for lead, gross non-volatile beta, and radium-226/228.

The project attempted to determine if constituents, other than naturally occurring, have impacted the groundwater regime within the network. The results indicate that several non-radiological constituents and naturally occurring radioisotopes are influencing groundwater quality.

Independent monitoring of basic water quality parameters, metals, tritium, gross alpha, non-volatile beta, and gamma-emitting radioisotopes will continue along with evaluating the DOE-SR groundwater monitoring data. Continued monitoring will provide a better understanding of actual groundwater quality parameter levels, their extent, and trends. Several important benefits can be realized as a result: (a) the ability to compare most recent data with historical data and (b) for SCDHEC Bureau of Water to further evaluate the extent of naturally occurring radioisotopes in the region.

2.1.2

Map 2. Ambient Groundwater Network



2.1.3 Tables and Figures
Ambient Groundwater Monitoring, 2003

Table 1. Summary of Contaminants Detected Above an Established MCL in 2003.

Well No.	Well Name	Analyte	MCL	Concentration	Aquifer
M02205	SCDNR Cluster C-2, AIK-817	Lead	0.015 mg/L	0.038 mg/L	MB
P-17TC	SRS Cluster P-17	Lead	0.015 mg/L	0.027 mg/L	CB
M02204	SCDNR Cluster C-2, AIK-818	Gross Beta	4 mrem/yr or 8 pCi/L	16.4 pCi/L	MB
M02305	SCDNR Cluster C-3, AIK-845	Gross Beta	4 mrem/yr or 8 pCi/L	19.5 pCi/L	MB
P-30TC	SRS Cluster P-30	Ra-226/228	5 pCi/L (combined)	6.01 pCi/L	CB
P-17TA	SRS Cluster P-17	Ra-226/228	5 pCi/L (combined)	5.38 pCi/L	MB

2.1.4 Data

Ambient Groundwater Data, 2003

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-29TD		P-30TA	
		04/09/03		04/09/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	19.3		19.5	
	Alkalinity (mg/L)	5		1	
	pH (S.U.)	5.53		5.41	
	Conductivity (mmho/cm)	28		16	
	Dissolved Oxygen (mg/L)	2.36		5.68	
	Turbidity (NTU)	0		11	
	Background Radiation (uR/hr)	10.2		6.8	
Chemistry	Alkalinity (mg/L)	3.7	NA	6.2	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	5.6	NA	1.8	NA
	pH, Lab (S.U.)	5.7	NA	6	NA
	Specific Conductance (@25C) (umhos/cm)	37.2	NA	23.7	NA
	Total Dissolved Solids (mg/L)	28	NA	16	NA
	Total Organic Carbon (mg/L)	<2.0	NA	<2.0	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.7	NA	2	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate (mg/L)	0	NA	0	NA
	Ammonia Nitrogen (mg/L)	<0.050	NA	<0.050	NA
	Total Kjeldahl Nitrogen (mg/L)	<0.10	NA	<0.10	NA
	Phosphate, Ortho. (mg/L)	<0.020	NA	<0.020	NA
	Total Phosphorus (mg/L)	<0.020	NA	<0.020	NA
	Sulfate (mg/L)	7.8	NA	<5.0	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-29TD		P-30TA	
		04/09/03		04/09/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrisodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-29TD		P-30TA	
		04/09/03		04/09/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	0.11	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	0.00024	NA	<0.00010	NA
	Calcium (mg/L)	1.8	NA	0.46	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	2.9	NA	14	NA
	Lead (mg/L)	<0.0050	NA	<0.0050	NA
	Magnesium (mg/L)	0.28	NA	0.16	NA
	Manganese (mg/L)	<0.080	NA	0.069	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	0.03	NA
	Potassium (mg/L)	<1.0	NA	<1.0	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	1.1	NA	1.7	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	0.017	NA	0.1	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-29TD		P-30TA		
		04/09/03		04/09/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<190	NA	<190	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	6.37E+00	NA	<MDA	NA
	MDA	(pCi/L)	1.67E+00		1.12E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA	NA
	MDA	(pCi/L)	1.58E+00		1.57E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<3.557E01	NA	<3.673E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<2.602E00	NA	<2.874E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.362E01	NA	<2.300E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.874E00	NA	<2.722E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<3.815E00	NA	<3.522E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.731E00	NA	<2.786E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<6.047E00	NA	<6.012E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<2.851E00	NA	<3.237E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<6.804E00	NA	<6.772E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<4.813E00	NA	<4.931E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<7.779E00	NA	<8.172E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<5.501E01	NA	<6.012E01	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.765E00	NA	<2.647E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.869E00	NA	<2.934E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.762E01	NA	<2.738E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<8.525E00	NA	<8.817E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<7.001E00	NA	<7.099E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<1.593E01	NA	<1.562E01	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<6.016E00	NA	<5.899E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<7.045E00	NA	<6.381E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<7.345E01	NA	<7.541E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<1.290E01	NA	<1.264E01	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<8.543E01	NA	<8.313E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<6.369E01	NA	<6.268E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-30TC		BLIND DUP-01	
		04/10/03		04/10/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	18.7			
	Alkalinity (mg/L)	11			
	pH (S.U.)	6.53			
	Conductivity (mmho/cm)	40			
	Dissolved Oxygen (mg/L)	6.18			
	Turbidity (NTU)	0			
	Background Radiation (uR/hr)	11.05			
Chemistry	Alkalinity (mg/L)	22	NA	21	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	22	NA	24	NA
	pH, Lab (S.U.)	7.1	NA	7.1	NA
	Specific Conductance (@25C) (umhos/cm)	48.6	NA	52.2	NA
	Total Dissolved Solids (mg/L)	40	NA	36	NA
	Total Organic Carbon (mg/L)	<2.0	NA	<2.0	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.6	NA	1.6	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	0.42	NA	0.39	NA
	Nitrate (mg/L)	0.42	NA	0.39	NA
	Ammonia Nitrogen (mg/L)	<0.050	NA	<0.050	NA
	Total Kjeldahl Nitrogen (mg/L)	<0.10	NA	0.1	NA
	Phosphate, Ortho. (mg/L)	0.09	NA	0.082	NA
	Total Phosphorus (mg/L)	0.07	NA	0.10	NA
	Sulfate (mg/L)	<5.0	NA	<5.0	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-30TC		BLIND DUP-01	
		04/10/03		04/10/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-30TC		BLIND DUP-01	
		04/10/03		04/10/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.0025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	8.3	NA	9.1	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	0.041	NA	0.039	NA
	Lead (mg/L)	<0.0050	NA	<0.0050	NA
	Magnesium (mg/L)	0.2	NA	0.20	NA
	Manganese (mg/L)	<0.010	NA	<0.010	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	<1.0	NA	<1.0	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	1.4	NA	1.3	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-30TC		BLIND DUP-01	
		04/10/03		04/10/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2 (pCi/L) (sigma)	<190	NA	<190	NA
	Gross Alpha ± 2 (pCi/L) (sigma)	1.30E+00	NA	1.17E+00	NA
	MDA (pCi/L)	9.57E-01		9.36E-01	
	Gross Non-volatile Beta ± 2 (pCi/L) (sigma)	1.09E+00		1.09E+00	
	MDA (pCi/L)	1.58E+00		1.58E+00	
	Beryllium-7 ± 2 (pCi/L) (sigma)	<3.202E01	NA	<3.470E01	NA
	Sodium-22 ± 2 (pCi/L) (sigma)	<2.746E00	NA	<2.705E00	NA
	Potassium-40 ± 2 (pCi/L) (sigma)	<2.541E01	NA	<2.488E01	NA
	Manganese-54 ± 2 (pCi/L) (sigma)	<2.867E00	NA	<2.748E00	NA
	Cobalt-58 ± 2 (pCi/L) (sigma)	<3.468E00	NA	<3.730E00	NA
	Cobalt-60 ± 2 (pCi/L) (sigma)	<2.390E00	NA	<2.840E00	NA
	Zinc-65 ± 2 (pCi/L) (sigma)	<5.197E00	NA	<5.933E00	NA
	Yttrium-88 ± 2 (pCi/L) (sigma)	<3.331E00	NA	<3.180E00	NA
	Zirconium-95 ± 2 (pCi/L) (sigma)	<6.373E00	NA	<6.372E00	NA
	Ruthenium-103 ± 2 (pCi/L) (sigma)	<4.665E00	NA	<4.573E00	NA
	Antimony-125 ± 2 (pCi/L) (sigma)	<8.193E00	NA	<8.424E00	NA
	Iodine-131 ± 2 (pCi/L) (sigma)	<4.437E01	NA	<5.291E01	NA
	Cesium-134 ± 2 (pCi/L) (sigma)	<2.686E00	NA	<2.668E00	NA
	Cesium-137 ± 2 (pCi/L) (sigma)	<3.058E00	NA	<2.825E00	NA
	Cerium-144 ± 2 (pCi/L) (sigma)	<2.705E01	NA	<2.621E01	NA
	Europium-152 ± 2 (pCi/L) (sigma)	<8.759E00	NA	<8.366E00	NA
	Europium-154 ± 2 (pCi/L) (sigma)	<7.104E00	NA	<7.089E00	NA
	Europium-155 ± 2 (pCi/L) (sigma)	<1.625E01	NA	<1.584E01	NA
	Lead-212 ± 2 (pCi/L) (sigma)	<5.707E00	NA	<5.845E00	NA
	Lead-214 ± 2 (pCi/L) (sigma)	<6.650E00	NA	<6.042E00	NA
	Radium-226 ± 2 (pCi/L) (sigma)	<7.176E01	NA	<7.562E01	NA
	Actinium-228 ± 2 (pCi/L) (sigma)	<1.169E01	NA	<1.200E01	NA
	Thorium-234 ± 2 (pCi/L) (sigma)	<8.309E01	NA	<8.804E01	NA
	Americium-241 ± 2 (pCi/L) (sigma)	<6.377E01	NA	<6.308E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-28TE		FC-2C	
		04/10/03		04/15/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	18.8		22.16	
	Alkalinity (mg/L)	3			
	pH (S.U.)	6.17		7.11	
	Conductivity (mmho/cm)	52		171	
	Dissolved Oxygen (mg/L)	1.33		4.28	
	Turbidity (NTU)	2		0.69	
	Background Radiation (uR/hr)	15.3		11.05	
Chemistry	Alkalinity (mg/L)	14	NA	76	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	26	NA	88	NA
	pH, Lab (S.U.)	6.6	NA	7.4	NA
	Specific Conductance (@25C) (umhos/cm)	64.9	NA	185	NA
	Total Dissolved Solids (mg/L)	44	NA	130	NA
	Total Organic Carbon (mg/L)	<2.0	NA	3.8	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.5	NA	2.5	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	<0.020	NA	0.11	NA
	Nitrate (mg/L)	0	NA	0.11	NA
	Ammonia Nitrogen (mg/L)	<0.050	NA	0.11	NA
	Total Kjeldahl Nitrogen (mg/L)	<0.10	NA	0.12	NA
	Phosphate, Ortho. (mg/L)	0.051	NA	0.11	NA
	Total Phosphorus (mg/L)	0.051	NA	0.1	NA
	Sulfate (mg/L)	9.9	NA	9.8	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-28TE		FC-2C	
		04/10/03		04/15/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-28TE		FC-2C	
		04/10/03		04/15/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.0025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	10	NA	34	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	2	NA	0.049	NA
	Lead (mg/L)	0.0098	NA	<0.0050	NA
	Magnesium (mg/L)	0.37	NA	0.66	NA
	Manganese (mg/L)	0.035	NA	0.065	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	<1.0	NA	<1.0	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	1.1	NA	2	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	0.021	NA	0.02	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-28TE		FC-2C		
		04/10/03		04/15/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<190	NA	227	NA
					109	
	Gross Alpha ± 2	(pCi/L) (sigma)	2.52E+00	NA	<MDA	NA
	MDA	(pCi/L)	1.18E+00			
			1.11E+00		1.61E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA	NA
	MDA	(pCi/L)	1.58E+00		1.56E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<3.270E01	NA	<2.802E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<2.731E00	NA	<2.914E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.221E01	NA	<2.961E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.780E00	NA	<2.696E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<3.237E00	NA	<3.041E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.544E00	NA	<2.817E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<5.540E00	NA	<5.625E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<2.870E00	NA	<2.570E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<6.217E00	NA	<5.693E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<4.246E00	NA	<3.727E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<7.829E00	NA	<8.266E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<3.127E01	NA	<1.126E01	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.601E00	NA	<2.571E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.871E00	NA	<2.979E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.653E01	NA	<2.565E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<8.743E00	NA	<8.470E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<6.925E00	NA	<7.242E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<1.567E01	NA	<1.619E01	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<5.705E00	NA	<5.946E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<6.580E00	NA	<6.067E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<7.338E01	NA	<7.286E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<1.204E01	NA	<1.177E01	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<8.391E01	NA	<8.637E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<6.263E01	NA	<6.568E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	FC-2D		P16-TC	
		04/15/03		04/15/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	21.13		20.03	
	Alkalinity (mg/L)				
	pH (S.U.)	6.69		5.63	
	Conductivity (mmho/cm)	87		18	
	Dissolved Oxygen (mg/L)	5.04		6.68	
	Turbidity (NTU)	0.18		12.8	
	Background Radiation (uR/hr)	11.05		9.35	
Chemistry	Alkalinity (mg/L)	40	NA	5.8	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	39	NA	2.8	NA
	pH, Lab (S.U.)	7.1	NA	6.2	NA
	Specific Conductance (@25C) (umhos/cm)	97.7	NA	20	NA
	Total Dissolved Solids (mg/L)	48	NA	8	NA
	Total Organic Carbon (mg/L)	<2.0	NA	<2.0	NA
	Bromide (mg/L)	0.026	NA	<0.020	NA
	Chloride (mg/L)	2.8	NA	1.6	NA
	Fluoride (mg/L)	0.15	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	0.63	NA	<0.020	NA
	Nitrate (mg/L)	0.63	NA	0	NA
	Ammonia Nitrogen (mg/L)	0.053	NA	<0.050	NA
	Total Kjeldahl Nitrogen (mg/L)	<0.10	NA	<0.10	NA
	Phosphate, Ortho. (mg/L)	0.13	NA	<0.020	NA
	Total Phosphorus (mg/L)	0.1	NA	<0.020	NA
	Sulfate (mg/L)	<5.0	NA	<5.0	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	FC-2D		P16-TC	
		04/15/03		04/15/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	FC-2D		P16-TC	
		04/15/03		04/15/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.0025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	0.0006	NA	<0.00010	NA
	Calcium (mg/L)	15	NA	0.86	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	<0.020	NA	1.6	NA
	Lead (mg/L)	<0.0050	NA	<0.0050	NA
	Magnesium (mg/L)	0.36	NA	0.16	NA
	Manganese (mg/L)	<0.010	NA	0.043	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	1.4	NA	<1.0	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	2.4	NA	0.76	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	0.32	NA	0.016	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	FC-2D		P16-TC	
		04/15/03		04/15/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	1060 148	NA	<190
	Gross Alpha ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA
	MDA	(pCi/L)	1.28E+00		1.09E+00
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA
	MDA	(pCi/L)	1.56E+00		1.58E+00
	Beryllium-7 ± 2	(pCi/L) (sigma)	<2.888E01	NA	<2.920E01
	Sodium-22 ± 2	(pCi/L) (sigma)	<2.850E00	NA	<2.641E00
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.377E01	NA	<2.628E01
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.788E00	NA	<2.795E00
	Cobalt-58 ± 2	(pCi/L) (sigma)	<3.163E00	NA	<3.150E00
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.548E00	NA	<2.399E00
	Zinc-65 ± 2	(pCi/L) (sigma)	<5.346E00	NA	<5.808E00
	Yttrium-88 ± 2	(pCi/L) (sigma)	<2.962E00	NA	<2.779E00
	Zirconium-95 ± 2	(pCi/L) (sigma)	<5.774E00	NA	<5.759E00
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<3.827E00	NA	<3.878E00
	Antimony-125 ± 2	(pCi/L) (sigma)	<7.835E00	NA	<7.994E00
	Iodine-131 ± 2	(pCi/L) (sigma)	<1.715E01	NA	<1.818E01
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.611E00	NA	<2.591E00
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.911E00	NA	<2.864E00
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.616E01	NA	<2.588E01
	Europium-152 ± 2	(pCi/L) (sigma)	<8.329E00	NA	<8.719E00
	Europium-154 ± 2	(pCi/L) (sigma)	<6.803E00	NA	<7.005E00
	Europium-155 ± 2	(pCi/L) (sigma)	<1.539E01	NA	<1.519E01
	Lead-212 ± 2	(pCi/L) (sigma)	<5.942E00	NA	<5.808E00
	Lead-214 ± 2	(pCi/L) (sigma)	<6.403E00	NA	<6.945E00
	Radium-226 ± 2	(pCi/L) (sigma)	<7.381E01	NA	<7.382E01
	Actinium-228 ± 2	(pCi/L) (sigma)	<1.114E01	NA	<1.228E01
	Thorium-234 ± 2	(pCi/L) (sigma)	<8.568E01	NA	<8.579E01
	Americium-241 ± 2	(pCi/L) (sigma)	<6.452E01	NA	<6.138E01

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-16B		P-17TA	
		04/16/03		04/16/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	18.5		21.29	
	Alkalinity (mg/L)				
	pH (S.U.)	4.9		5.37	
	Conductivity (mmho/cm)	15		38	
	Dissolved Oxygen (mg/L)	9.3		0.11	
	Turbidity (NTU)	0.16		0.54	
Chemistry	Background Radiation (uR/hr)	6.8		8.5	
	Alkalinity (mg/L)	<1.0	NA	3.3	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	3	NA	5.4	NA
	pH, Lab (S.U.)	5.4	NA	5.6	NA
	Specific Conductance (@25C) (umhos/cm)	18.1	NA	43.3	NA
	Total Dissolved Solids (mg/L)	8	NA	12	NA
	Total Organic Carbon (mg/L)	<2.0	NA	2.8	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.8	NA	1.6	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	0.68	NA	<0.020	NA
	Nitrate (mg/L)	0.68	NA	0	NA
	Ammonia Nitrogen (mg/L)	0.097	NA	0.087	NA
	Total Kjeldahl Nitrogen (mg/L)	0.21	NA	0.11	NA
	Phosphate, Ortho. (mg/L)	<0.020	NA	<0.020	NA
	Total Phosphorus (mg/L)	<0.020	NA	<0.020	NA
	Sulfate (mg/L)	<5.0	NA	10	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-16B		P-17TA	
		04/16/03		04/16/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-16B		P-17TA	
		04/16/03		04/16/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	0.24	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	0.57	NA	1.6	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	0.02	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	<0.020	NA	3.7	NA
	Lead (mg/L)	<0.0050	NA	0.012	NA
	Magnesium (mg/L)	0.39	NA	0.35	NA
	Manganese (mg/L)	<0.010	NA	0.051	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	<1.0	NA	<1.0	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	1.1	NA	1.3	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	<0.010	NA	0.015	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-16B		P-17TA	
		04/16/03		04/16/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	679 131	NA	<190
	Gross Alpha ± 2	(pCi/L) (sigma)	2.31E+00 1.12E+00	NA	5.19E+00 1.54E+00
	MDA	(pCi/L)	1.08E+00		1.12E+00
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	<MDA 1.58E+00	NA	2.22E+00 1.42E+00
	Beryllium-7 ± 2	(pCi/L) (sigma)	<3.193E01	NA	<3.386E01
	Sodium-22 ± 2	(pCi/L) (sigma)	<2.633E00	NA	<2.978E00
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.628E01	NA	<2.451E01
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.719E00	NA	<2.731E00
	Cobalt-58 ± 2	(pCi/L) (sigma)	<3.571E00	NA	<3.371E00
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.720E00	NA	<2.608E00
	Zinc-65 ± 2	(pCi/L) (sigma)	<5.469E00	NA	<5.480E00
	Yttrium-88 ± 2	(pCi/L) (sigma)	<2.976E00	NA	<3.053E00
	Zirconium-95 ± 2	(pCi/L) (sigma)	<6.249E00	NA	<6.284E00
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<4.678E00	NA	<4.504E00
	Antimony-125 ± 2	(pCi/L) (sigma)	<7.914E00	NA	<7.967E00
	Iodine-131 ± 2	(pCi/L) (sigma)	<3.342E01	NA	<3.605E01
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.610E00	NA	<2.600E00
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.964E00	NA	<2.954E00
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.652E01	NA	<2.588E01
	Europium-152 ± 2	(pCi/L) (sigma)	<8.580E00	NA	<8.500E00
	Europium-154 ± 2	(pCi/L) (sigma)	<6.850E00	NA	<6.911E00
	Europium-155 ± 2	(pCi/L) (sigma)	<1.556E01	NA	<1.583E01
	Lead-212 ± 2	(pCi/L) (sigma)	<5.883E00	NA	<5.788E00
	Lead-214 ± 2	(pCi/L) (sigma)	<6.203E00	NA	<6.735E00
	Radium-226 ± 2	(pCi/L) (sigma)	<6.821E01	NA	<7.078E01
	Actinium-228 ± 2	(pCi/L) (sigma)	<1.159E01	NA	<1.246E01
	Thorium-234 ± 2	(pCi/L) (sigma)	<8.418E01	NA	<8.588E01
	Americium-241 ± 2	(pCi/L) (sigma)	<6.360E01	NA	<6.289E01

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	BLIND DUP-02		P-17TC	
		04/16/03		04/21/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)			22	
	Alkalinity (mg/L)			2	
	pH (S.U.)			6.03	
	Conductivity (mmho/cm)			5	
	Dissolved Oxygen (mg/L)			8.81	
	Turbidity (NTU)			0	
Chemistry	Background Radiation (uR/hr)			12.75	
	Alkalinity (mg/L)	3.2	NA	17	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	6.5	NA	22	NA
	pH, Lab (S.U.)	5.7	NA	6.8	NA
	Specific Conductance (@25C) (umhos/cm)	43	NA	72.2	NA
	Total Dissolved Solids (mg/L)	6	NA	38	NA
	Total Organic Carbon (mg/L)	<2.0	NA	<2.0	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.6	NA	1.7	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate (mg/L)	0	NA	0	NA
	Ammonia Nitrogen (mg/L)	0.088	NA	0.088	NA
	Total Kjeldahl Nitrogen (mg/L)	0.11	NA	<0.10	NA
	Phosphate, Ortho. (mg/L)	<0.020	NA	<0.020	NA
	Total Phosphorus (mg/L)	<0.020	NA	<0.020	NA
	Sulfate (mg/L)	9.5	NA	10	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	BLIND DUP-02		P-17TC	
		04/16/03		04/21/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrisodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	BLIND DUP-02		P-17TC	
		04/16/03		04/21/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.0025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	0.23	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	2	NA	8.4	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	3.5	NA	3	NA
	Lead (mg/L)	<0.0050	NA	0.027	NA
	Magnesium (mg/L)	0.37	NA	0.31	NA
	Manganese (mg/L)	0.058	NA	0.03	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	<1.0	NA	1.7	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	1.3	NA	2.5	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	0.016	NA	0.044	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	BLIND DUP-02		P-17TC		
		04/16/03		04/21/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	NA	NA	<195	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	NA	NA	<MDA	NA
	MDA	(pCi/L)			1.60E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	NA	NA	<MDA	NA
	MDA	(pCi/L)			1.67E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	NA	NA	<1.390E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	NA	NA	<1.279E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	NA	NA	<2.368E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	NA	NA	<1.285E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	NA	NA	<1.514E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	NA	NA	<1.217E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	NA	NA	<2.591E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	NA	NA	<1.313E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	NA	NA	<2.716E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	NA	NA	<1.877E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	NA	NA	<4.193E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	NA	NA	<6.684E00	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	NA	NA	<1.389E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	NA	NA	<1.319E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	NA	NA	<1.166E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	NA	NA	<4.260E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	NA	NA	<2.993E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	NA	NA	<4.997E00	NA
	Lead-212 ± 2	(pCi/L) (sigma)	NA	NA	<2.720E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	NA	NA	<3.565E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	NA	NA	<3.550E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	NA	NA	<5.992E00	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	NA	NA	<3.748E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	NA	NA	<8.406E00	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-24TA		P-24TC	
		04/21/03		04/22/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	21.63		21.09	
	Alkalinity (mg/L)	2.5			
	pH (S.U.)	7.22		6.12	
	Conductivity (mmho/cm)	65		59	
	Dissolved Oxygen (mg/L)	0.05		0.11	
	Turbidity (NTU)	6.24		0.98	
	Background Radiation (uR/hr)	8.5		10.2	
Chemistry	Alkalinity (mg/L)	12	NA	21	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	21	NA	25	NA
	pH, Lab (S.U.)	6.4	NA	6.4	NA
	Specific Conductance (@25C) (umhos/cm)	55.9	NA	69.7	NA
	Total Dissolved Solids (mg/L)	32	NA	42	NA
	Total Organic Carbon (mg/L)	<2.0	NA	<2.0	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.5	NA	1.9	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate (mg/L)	0	NA	0	NA
	Ammonia Nitrogen (mg/L)	<0.050	NA	<0.050	NA
	Total Kjeldahl Nitrogen (mg/L)	<0.10	NA	<0.10	NA
	Phosphate, Ortho. (mg/L)	0.13	NA	0.17	NA
	Total Phosphorus (mg/L)	0.097	NA	0.14	NA
	Sulfate (mg/L)	8.2	NA	8.1	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-24TA		P-24TC	
		04/21/03		04/22/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-24TA		P-24TC	
		04/21/03		04/22/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	7.8	NA	9.1	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	0.49	NA	1.9	NA
	Lead (mg/L)	<0.0050	NA	<0.0050	NA
	Magnesium (mg/L)	0.33	NA	0.51	NA
	Manganese (mg/L)	0.016	NA	0.038	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	<1.0	NA	1.2	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	0.93	NA	1.1	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-24TA		P-24TC		
		04/21/03		04/22/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<195	NA	<195	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA	NA
	MDA	(pCi/L)	1.68E+00		1.67E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	2.77E+00 1.48E+00	NA	<MDA	NA
	MDA	(pCi/L)	1.67E+00		1.67E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<1.495E01	NA	<1.497E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<1.306E00	NA	<1.323E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.374E01	NA	<1.089E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<1.380E00	NA	<1.358E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<1.560E00	NA	<1.386E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<1.253E00	NA	<1.359E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<2.838E00	NA	<2.806E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<1.422E00	NA	<1.356E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<2.594E00	NA	<3.002E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<2.056E00	NA	<2.051E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<4.221E00	NA	<4.292E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<1.013E01	NA	<9.526E00	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<1.299E00	NA	<1.391E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<1.388E00	NA	<1.496E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<1.236E01	NA	<1.293E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<4.449E00	NA	<4.513E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<3.131E00	NA	<3.116E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<5.314E00	NA	<5.404E00	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<2.809E00	NA	<2.613E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<3.795E00	NA	<3.545E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<3.760E01	NA	<3.486E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<6.147E00	NA	<6.198E00	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<3.793E01	NA	<3.711E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<8.761E00	NA	<8.369E00	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-24A		P-23B	
		04/22/03		04/22/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	21.3		20.08	
	Alkalinity (mg/L)				
	pH (S.U.)	9.14		7.00	
	Conductivity (mmho/cm)	84		157	
	Dissolved Oxygen (mg/L)	5.22		0.09	
	Turbidity (NTU)	1.3		0.34	
	Background Radiation (uR/hr)	10.2		11.07	
Chemistry	Alkalinity (mg/L)	45	NA	85	NA
	Pth. Alkalinity (mg/L)	7.8	NA	0	NA
	Hardness (calculated) (mg/L)	49	NA	93	NA
	pH, Lab (S.U.)	9.3	NA	7.5	NA
	Specific Conductance (@25C) (umhos/cm)	99.2	NA	190	NA
	Total Dissolved Solids (mg/L)	48	NA	180	NA
	Total Organic Carbon (mg/L)	2.3	NA	3.4	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	2.3	NA	2.5	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate (mg/L)	0	NA	0	NA
	Ammonia Nitrogen (mg/L)	0.085	NA	0.057	NA
	Total Kjeldahl Nitrogen (mg/L)	<0.10	NA	<0.10	NA
	Phosphate, Ortho. (mg/L)	<0.020	NA	0.029	NA
	Total Phosphorus (mg/L)	<0.020	NA	<0.020	NA
	Sulfate (mg/L)	<5.0	NA	9.9	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-24A		P-23B	
		04/22/03		04/22/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-24A		P-23B	
		04/22/03		04/22/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.0025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	0.083	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	19	NA	36	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	0.13	NA	0.28	NA
	Lead (mg/L)	<0.0050	NA	<0.0050	NA
	Magnesium (mg/L)	0.29	NA	0.77	NA
	Manganese (mg/L)	<0.010	NA	0.014	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	1.5	NA	1.2	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	1.9	NA	1.6	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	0.020	NA	<0.020	NA
	Zinc (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-24A		P-23B		
		04/22/03		04/22/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<195	NA	<195	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA	NA
	MDA	(pCi/L)	1.83E+00		2.48E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA	NA
	MDA	(pCi/L)	1.66E+00		1.66E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<1.548E01	NA	<1.571E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<1.405E00	NA	<1.345E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.421E01	NA	<2.388E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<1.298E00	NA	<1.233E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<1.612E00	NA	<1.575E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<1.234E00	NA	<1.178E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<2.711E00	NA	<2.751E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<1.335E00	NA	<1.482E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<2.640E00	NA	<2.801E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<1.942E00	NA	<1.972E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<3.947E00	NA	<4.246E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<8.345E00	NA	<9.712E00	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<1.364E00	NA	<1.325E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<1.572E00	NA	<1.504E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<1.209E01	NA	<1.240E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<4.403E00	NA	<4.345E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<3.139E00	NA	<3.074E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<5.272E00	NA	<5.281E00	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<2.641E00	NA	<2.822E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<3.805E00	NA	<3.617E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<3.538E01	NA	<3.562E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<5.682E00	NA	<5.750E00	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<3.733E01	NA	<3.543E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<8.392E00	NA	<8.251E00	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-23TC		P-23TA	
		04/22/03		04/23/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	22.01		21.8	
	Alkalinity (mg/L)	4		2.1	
	pH (S.U.)	6.29		5.53	
	Conductivity (mmho/cm)	70		61.1	
	Dissolved Oxygen (mg/L)	0.13			
	Turbidity (NTU)	14.7		1.14	
	Background Radiation (uR/hr)	11.07		10.21	
Chemistry	Alkalinity (mg/L)	22	NA	16	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	16	NA	5.1	NA
	pH, Lab (S.U.)	6.7	NA	6.5	NA
	Specific Conductance (@25C) (umhos/cm)	80.4	NA	68.9	NA
	Total Dissolved Solids (mg/L)	44	NA	34	NA
	Total Organic Carbon (mg/L)	<2.0	NA	<2.0	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.8	NA	1.5	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate (mg/L)	0	NA	0	NA
	Ammonia Nitrogen (mg/L)	0.12	NA	0.059	NA
	Total Kjeldahl Nitrogen (mg/L)	0.16	NA	0.18	NA
	Phosphate, Ortho. (mg/L)	0.083	NA	0.05	NA
	Total Phosphorus (mg/L)	0.082	NA	0.037	NA
	Sulfate (mg/L)	12	NA	11	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-23TC		P-23TA	
		04/22/03		04/23/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-23TC		P-23TA	
		04/22/03		04/23/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	0.066	NA	<0.050	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	4.5	NA	1.4	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	2.3	NA	4	NA
	Lead (mg/L)	<0.0050	NA	<0.0050	NA
	Magnesium (mg/L)	1.2	NA	0.40	NA
	Manganese (mg/L)	0.044	NA	0.57	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	5	NA	4.5	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	3.1	NA	4.8	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-23TC		P-23TA	
		04/22/03		04/23/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2 (pCi/L) (sigma)	<195	NA	<190	NA
	Gross Alpha ± 2 (pCi/L) (sigma)	<MDA	NA	<MDA	NA
	MDA (pCi/L)	1.67E+00		1.56E+00	
	Gross Non-volatile Beta ± 2 (pCi/L) (sigma)	3.51E+00	NA	<MDA	NA
	MDA (pCi/L)	1.53E+00		1.67E+00	
	Beryllium-7 ± 2 (pCi/L) (sigma)	1.67E+00	NA	<1.572E01	NA
	Sodium-22 ± 2 (pCi/L) (sigma)	<1.203E00	NA	<1.230E00	NA
	Potassium-40 ± 2 (pCi/L) (sigma)	<2.447E01	NA	<1.290E01	NA
	Manganese-54 ± 2 (pCi/L) (sigma)	1.272E+00	NA	<1.313E00	NA
	Cobalt-58 ± 2 (pCi/L) (sigma)	<1.465E00	NA	<1.485E00	NA
	Cobalt-60 ± 2 (pCi/L) (sigma)	<1.220E00	NA	<1.335E00	NA
	Zinc-65 ± 2 (pCi/L) (sigma)	<2.395E00	NA	<2.688E00	NA
	Yttrium-88 ± 2 (pCi/L) (sigma)	<1.567E00	NA	<1.530E00	NA
	Zirconium-95 ± 2 (pCi/L) (sigma)	<3.056E00	NA	<2.737E00	NA
	Ruthenium-103 ± 2 (pCi/L) (sigma)	<2.022E00	NA	<1.957E00	NA
	Antimony-125 ± 2 (pCi/L) (sigma)	<4.301E00	NA	<4.094E00	NA
	Iodine-131 ± 2 (pCi/L) (sigma)	<1.046E01	NA	<9.805E00	NA
	Cesium-134 ± 2 (pCi/L) (sigma)	<1.368E00	NA	<1.390E00	NA
	Cesium-137 ± 2 (pCi/L) (sigma)	<1.389E00	NA	<1.385E00	NA
	Cerium-144 ± 2 (pCi/L) (sigma)	<1.207E01	NA	<1.251E01	NA
	Europium-152 ± 2 (pCi/L) (sigma)	<4.464E00	NA	<4.520E00	NA
	Europium-154 ± 2 (pCi/L) (sigma)	<3.136E00	NA	<3.018E00	NA
	Europium-155 ± 2 (pCi/L) (sigma)	<5.288E00	NA	<4.946E00	NA
	Lead-212 ± 2 (pCi/L) (sigma)	<2.888E00	NA	<2.723E00	NA
	Lead-214 ± 2 (pCi/L) (sigma)	<3.755E00	NA	<3.405E00	NA
	Radium-226 ± 2 (pCi/L) (sigma)	<3.652E01	NA	<3.687E01	NA
	Actinium-228 ± 2 (pCi/L) (sigma)	<6.359E00	NA	<5.753E00	NA
	Thorium-234 ± 2 (pCi/L) (sigma)	<2.893E01	NA	<3.626E01	NA
	Americium-241 ± 2 (pCi/L) (sigma)	<8.429E00	NA	<8.264E00	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-26 A		P-26 TC	
		04/23/03		04/23/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	21.2		21.8	
	Alkalinity (mg/L)				
	pH (S.U.)	5.07		5.84	
	Conductivity (mmho/cm)	35.6		65.4	
	Dissolved Oxygen (mg/L)				
	Turbidity (NTU)	0.24		0.16	
	Background Radiation (uR/hr)	24.6		24.6	
Chemistry	Alkalinity (mg/L)	5.2	NA	21	NA
	Pth. Alkalinity (mg/L)	0	NA	0	NA
	Hardness (calculated) (mg/L)	8.5	NA	16	NA
	pH, Lab (S.U.)	5.8	NA	6.5	NA
	Specific Conductance (@25C) (umhos/cm)	38.2	NA	73.4	NA
	Total Dissolved Solids (mg/L)	48	NA	40	NA
	Total Organic Carbon (mg/L)	<2.0	NA	<2.0	NA
	Bromide (mg/L)	<0.020	NA	<0.020	NA
	Chloride (mg/L)	1.8	NA	1.5	NA
	Fluoride (mg/L)	<0.10	NA	<0.10	NA
	Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate/Nitrite (mg/L)	<0.020	NA	<0.020	NA
	Nitrate (mg/L)	0	NA	0	NA
	Ammonia Nitrogen (mg/L)	<0.050	NA	0.087	NA
	Total Kjeldahl Nitrogen (mg/L)	<0.10	NA	0.10	NA
	Phosphate, Ortho. (mg/L)	0.034	NA	0.11	NA
	Total Phosphorus (mg/L)	<0.020	NA	0.087	NA
	Sulfate (mg/L)	7.5	NA	10	NA
Volatile Organics	Chloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	Bromomethane (mg/L)	<0.0050	NA	<0.0050	NA
	Vinyl Chloride (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Acetone (mg/L)	<0.050	NA	<0.050	NA
	Carbon Disulfide (mg/L)	<0.0050	NA	<0.0050	NA
	Dichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,2-Dichloroethylene (mg/L)	<0.0050	NA	<0.0050	NA
	Chloroform (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	2-Butanone (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,1-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Carbon Tetrachloride (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,2-Dichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromodichloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2,2-Tetrachloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,2-Dichloropropane (mg/L)	<0.0050	NA	<0.0050	NA
	trans-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Trichloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Dibromochloromethane (mg/L)	<0.0050	NA	<0.0050	NA
	1,1,2-Trichloroethane (mg/L)	<0.0050	NA	<0.0050	NA
	Benzene (mg/L)	<0.0050	NA	<0.0050	NA
	cis-1,3-Dichloropropene (mg/L)	<0.0050	NA	<0.0050	NA
	Bromoform (mg/L)	<0.0050	NA	<0.0050	NA
	4-Methyl-2-Pentanone (mg/L)	<0.0050	NA	<0.0050	NA
	2-Hexanone (mg/L)	<0.0050	NA	<0.0050	NA
	Tetrachloroethene (mg/L)	<0.0050	NA	<0.0050	NA
	Toluene (mg/L)	<0.0050	NA	<0.0050	NA
	Chlorobenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Ethylbenzene (mg/L)	<0.0050	NA	<0.0050	NA
	Styrene (mg/L)	<0.0050	NA	<0.0050	NA
	Xylene (total) (mg/L)	<0.010	NA	<0.010	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-26A		P-26TC	
		04/23/03		04/23/03	
		Total	Dissolved	Total	Dissolved
Semi-Volatiles	Phenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,3-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	1,4-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzyl Alcohol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2-Dichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroisopropyl)ether (mg/L)	<0.0040	NA	<0.0040	NA
	4-Methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	n-Nitroso-di-n-propylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachloroethane (mg/L)	<0.0040	NA	<0.0040	NA
	Nitrobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Isophorone (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dimethyl phenol (mg/L)	<0.0040	NA	<0.0040	NA
	Benzoic Acid (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-chloroethoxy)methane (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	1,2,4-Trichlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobutadiene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chloro-3-methylphenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Methyl naphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorocyclopentadiene (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,6-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2,4,5-Trichlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	2-Chloronaphthalene (mg/L)	<0.0040	NA	<0.0040	NA
	2-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Dimethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthylene (mg/L)	<0.0040	NA	<0.0040	NA
	2,6-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	3-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	Acenaphthene (mg/L)	<0.0040	NA	<0.0040	NA
	2-methyl-4,6-dinitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitrophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenzofuran (mg/L)	<0.0040	NA	<0.0040	NA
	2,4-Dinitrotoluene (mg/L)	<0.0040	NA	<0.0040	NA
	Diethylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	4-Chlorophenyl-phenylether (mg/L)	<0.0040	NA	<0.0040	NA
	Fluorene (mg/L)	<0.0040	NA	<0.0040	NA
	4-Nitroaniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-nitrosodiphenylamine (mg/L)	<0.0040	NA	<0.0040	NA
	Aniline (mg/L)	<0.0040	NA	<0.0040	NA
	N-Nitrosodimethylamine (mg/L)	<0.0040	NA	<0.0040	NA
	4-Bromophenyl-phenyl ether (mg/L)	<0.0040	NA	<0.0040	NA
	Hexachlorobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Azobenzene (mg/L)	<0.0040	NA	<0.0040	NA
	Pentachlorophenol (mg/L)	<0.0040	NA	<0.0040	NA
	Phenanthrene (mg/L)	<0.0040	NA	<0.0040	NA
	Anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Di-n-butylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Butylbenzylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	3,3'-Dichlorobenzidine (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Chrysene (mg/L)	<0.0040	NA	<0.0040	NA
	bis(2-ethylhexyl)phthalate (mg/L)	<0.0040	NA	<0.0040	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	P-26A		P-26TC	
		04/23/03		04/23/03	
		Total	Dissolved	Total	Dissolved
	Di-n-octylphthalate (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(b)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(k)fluoranthene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(a)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Indeno(1,2,3-cd)pyrene (mg/L)	<0.0040	NA	<0.0040	NA
	Dibenz(a,h)anthracene (mg/L)	<0.0040	NA	<0.0040	NA
	Benzo(g,h,i)perylene (mg/L)	<0.0040	NA	<0.0040	NA
Pesticides/ PCBs	alpha-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	beta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	delta-Benzene hexachloride (mg/L)	<0.00010	NA	<0.00010	NA
	Lindane (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor (mg/L)	<0.00010	NA	<0.00010	NA
	Aldrin (mg/L)	<0.00010	NA	<0.00010	NA
	Heptachlor epoxide (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan I (mg/L)	<0.00010	NA	<0.00010	NA
	Dieldrin (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDE (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin (mg/L)	<0.00010	NA	<0.00010	NA
	Endrin aldehyde (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan II (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDD (mg/L)	<0.00010	NA	<0.00010	NA
	Endosulfan sulfate (mg/L)	<0.00010	NA	<0.00010	NA
	p,p'-DDT (mg/L)	<0.00010	NA	<0.00010	NA
	Chlordane (mg/L)	<0.00010	NA	<0.00010	NA
	Toxaphene (mg/L)	<0.025	NA	<0.0025	NA
	PCB-1016 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1221 (mg/L)	<0.0010	NA	<0.0010	NA
	PCB-1232 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1242 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1248 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1254 (mg/L)	<0.00050	NA	<0.00050	NA
	PCB-1260 (mg/L)	<0.00050	NA	<0.00050	NA
Metals	Aluminum (mg/L)	<0.10	NA	<0.10	NA
	Antimony (mg/L)	<0.0030	NA	<0.0030	NA
	Arsenic (mg/L)	<0.0050	NA	<0.0050	NA
	Barium (mg/L)	<0.050	NA	0.069	NA
	Boron (mg/L)	<0.10	NA	<0.10	NA
	Beryllium (mg/L)	<0.0030	NA	<0.0030	NA
	Cadmium (mg/L)	<0.00010	NA	<0.00010	NA
	Calcium (mg/L)	2.6	NA	4.9	NA
	Chromium (mg/L)	<0.010	NA	<0.010	NA
	Cobalt (mg/L)	<0.020	NA	<0.020	NA
	Copper (mg/L)	<0.010	NA	<0.010	NA
	Iron (mg/L)	0.82	NA	4.4	NA
	Lead (mg/L)	<0.0050	NA	<0.0050	NA
	Magnesium (mg/L)	0.49	NA	0.88	NA
	Manganese (mg/L)	0.017	NA	0.061	NA
	Mercury (mg/L)	<0.00020	NA	<0.00020	NA
	Nickel (mg/L)	<0.020	NA	<0.020	NA
	Potassium (mg/L)	1.4	NA	4	NA
	Selenium (mg/L)	<0.0020	NA	<0.0020	NA
	Silver (mg/L)	<0.030	NA	<0.030	NA
	Sodium (mg/L)	1.2	NA	2.1	NA
	Thallium (mg/L)	<0.0010	NA	<0.0010	NA
	Vanadium (mg/L)	<0.020	NA	<0.020	NA
	Zinc (mg/L)	<0.010	NA	0.01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	P-26A		P-26TC		
		04/23/03		04/23/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<190	NA	<190	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	<MDA	NA	<MDA	NA
	MDA	(pCi/L)	1.53E+00		1.65E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	1.86E+00 1.43E+00	NA	3.18E+00 1.50E+00	NA
	MDA	(pCi/L)	1.67E+00		1.67E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<1.582E01	NA	<1.530E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<1.243E00	NA	<1.341E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.429E01	NA	<2.447E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<1.435E00	NA	<1.332E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<1.483E00	NA	<1.548E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<1.345E00	NA	<1.398E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<2.723E00	NA	<2.437E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<1.451E00	NA	<1.411E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<2.857E00	NA	<2.810E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<1.981E00	NA	<2.109E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<3.983E00	NA	<4.119E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<9.576E00	NA	<1.080E01	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<1.332E00	NA	<1.330E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<1.370E00	NA	<1.404E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<1.185E01	NA	<1.259E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<4.462E00	NA	<4.476E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<3.094E00	NA	<3.149E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<5.294E00	NA	<5.392E00	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<2.803E00	NA	<2.833E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<3.680E00	NA	<3.893E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<4.295E01	NA	<3.554E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<5.740E00	NA	<5.537E00	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<2.811E01	NA	<3.662E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<8.281E00	NA	<8.372E00	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02101		M02104	
		05/19/03		05/19/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	19	NA	19.3	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	5.57	NA	5.5	NA
	Conductivity (mmho/cm)	20	NA	16	NA
	Dissolved Oxygen (mg/L)	9.7	NA	8.85	NA
	Turbidity (NTU)	0	NA	0	NA
	Background Radiation (uR/hr)	17.85	NA	17.85	NA
Chemistry	Alkalinity (mg/L)	4.2	4	4.4	4.9
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	5.3	5.8	1.6	1.6
	pH, Lab (S.U.)	5.6	5.7	5.8	5.8
	Specific Conductance (@25C) (umhos/cm)	25.0	29	20.4	20.4
	Total Dissolved Solids (mg/L)	36	32	28	28
	Total Organic Carbon (mg/L)	<2.0	2.2	<2.0	<2.0
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	2	2.1	1.9	1.8
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	0.11	0.10	0.043	0.042
	Nitrate (mg/L)	0.11	0.10	0.043	0.042
	Ammonia Nitrogen (mg/L)	<0.050	<0.050	<0.050	<0.050
	Total Kjeldahl Nitrogen (mg/L)	0.1	0.11	0.21	0.17
	Phosphate, Ortho. (mg/L)	<0.020	<0.020	<0.020	<0.020
	Total Phosphorus (mg/L)	<0.020	<0.020	<0.020	<0.020
	Sulfate (mg/L)	<5.0	<5.0	<5.0	<5.0
Metals	Aluminum (mg/L)	<0.10	<0.10	<0.10	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	0.0005	0.00051
	Calcium (mg/L)	1.8	2	0.33	0.39
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.076	<0.020	<0.020	0.03
	Lead (mg/L)	0.0051	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.20	0.2	0.19	0.16
	Manganese (mg/L)	<0.010	<0.010	<0.010	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	<1.0	<1.0	<1.0	0.35
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.3	1.4	1.3	1.2
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	0.44	0.33	2.7	2.4

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02101		M02104	
		05/19/03		05/19/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2 (pCi/L) (sigma)	<193	NA	<193	NA
	Gross Alpha ± 2 (pCi/L) (sigma)	<MDA		<MDA	
	MDA (pCi/L)	1.48E+00		1.41E+00	
	Gross Non-volatile Beta ± 2 (pCi/L) (sigma)	<MDA		<MDA	
	MDA (pCi/L)	1.59E+00		1.59E+00	
	Beryllium-7 ± 2 (pCi/L) (sigma)	<1.229E01	NA	<1.256E01	NA
	Sodium-22 ± 2 (pCi/L) (sigma)	<1.243E00	NA	<1.193E00	NA
	Potassium-40 ± 2 (pCi/L) (sigma)	<2.189E01	NA	<2.076E01	NA
	Manganese-54 ± 2 (pCi/L) (sigma)	<1.158E00	NA	<1.099E00	NA
	Cobalt-58 ± 2 (pCi/L) (sigma)	<1.320E00	NA	<1.332E00	NA
	Cobalt-60 ± 2 (pCi/L) (sigma)	<1.139E00	NA	<1.218E00	NA
	Zinc-65 ± 2 (pCi/L) (sigma)	<2.317E00	NA	<2.504E00	NA
	Yttrium-88 ± 2 (pCi/L) (sigma)	<1.300E00	NA	<1.303E00	NA
	Zirconium-95 ± 2 (pCi/L) (sigma)	<2.430E00	NA	<2.503E00	NA
	Ruthenium-103 ± 2 (pCi/L) (sigma)	<1.640E00	NA	<1.683E00	NA
	Antimony-125 ± 2 (pCi/L) (sigma)	<3.334E00	NA	<3.258E00	NA
	Iodine-131 ± 2 (pCi/L) (sigma)	<7.899E00	NA	<8.287E00	NA
	Cesium-134 ± 2 (pCi/L) (sigma)	<1.115E00	NA	<1.076E00	NA
	Cesium-137 ± 2 (pCi/L) (sigma)	<1.123E00	NA	<1.177E00	NA
	Cerium-144 ± 2 (pCi/L) (sigma)	<9.760E00	NA	<1.021E01	NA
	Europium-152 ± 2 (pCi/L) (sigma)	<3.705E00	NA	<3.620E00	NA
	Europium-154 ± 2 (pCi/L) (sigma)	<2.627E00	NA	<2.576E00	NA
	Europium-155 ± 2 (pCi/L) (sigma)	<4.361E00	NA	<4.400E00	NA
	Lead-212 ± 2 (pCi/L) (sigma)	<2.230E00	NA	<2.281E00	NA
	Lead-214 ± 2 (pCi/L) (sigma)	<2.857E00	NA	<2.663E00	NA
	Radium-226 ± 2 (pCi/L) (sigma)	<3.475E01	NA	<2.719E01	NA
	Actinium-228 ± 2 (pCi/L) (sigma)	<5.124E00	NA	<5.015E00	NA
	Thorium-234 ± 2 (pCi/L) (sigma)	<3.097E01	NA	<3.137E01	NA
	Americium-241 ± 2 (pCi/L) (sigma)	<6.698E00	NA	<6.579E00	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02102		M02103	
		05/ 20/ 03		05/ 20/ 03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	19.3	NA	21.3	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	5.65	NA	5.99	NA
	Conductivity (mmho/cm)	15	NA	19	NA
	Dissolved Oxygen (mg/L)	9.77	NA	8.02	NA
	Turbidity (NTU)	0	NA	6	NA
	Background Radiation (uR/hr)	12.75	NA	12.75	NA
Chemistry	Alkalinity (mg/L)	4	3.3	6.7	7.7
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	3.1	3	4.8	3.9
	pH, Lab (S.U.)	6	5.9	6.2	6.3
	Specific Conductance (@25C) (umhos/cm)	17.2	18.5	22.8	24.7
	Total Dissolved Solids (mg/L)	12	8	24	30
	Total Organic Carbon (mg/L)	3.3	2.4	3.6	3.6
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	1.9	1.8	1.8	1.8
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	0.12	0.12	0.026	0.024
	Nitrate (mg/L)	0.12	0.12	0.026	0.024
	Ammonia Nitrogen (mg/L)	<0.050	<0.050	<0.050	<0.050
	Total Kjeldahl Nitrogen (mg/L)	0.26	0.24	0.24	0.24
	Phosphate, Ortho. (mg/L)	<0.020	<0.020	<0.020	<0.020
	Total Phosphorus (mg/L)	<0.020	<0.020	<0.020	<0.020
	Sulfate (mg/L)	<5.0	<5.0	<5.0	<5.0
Metals	Aluminum (mg/L)	<0.10	<0.10	<0.10	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Calcium (mg/L)	0.99	0.94	1.6	1.8
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	<0.020	<0.020	<0.020	<0.020
	Lead (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.15	0.15	0.19	0.19
	Manganese (mg/L)	<0.010	<0.010	<0.010	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	<1.0	<1.0	<1.0	<1.0
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.3	1.3	1.2	1.3
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	0.6	0.5	1.2	1.1

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	M02102		M02103		
		05/20/03		05/20/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<193	NA	<193	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	<MDA		<MDA	
	MDA	(pCi/L)	1.42E+00		1.44E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	<MDA		<MDA	
	MDA	(pCi/L)	1.59E+00		1.59E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<1.218E01	NA	<1.245E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<1.186E00	NA	<1.215E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<1.134E01	NA	<2.203E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<1.088E00	NA	<1.169E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<1.279E00	NA	<1.223E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<1.104E00	NA	<1.111E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<2.799E00	NA	<2.560E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<1.391E00	NA	<1.296E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<2.197E00	NA	<2.357E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<1.647E00	NA	<1.632E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<3.104E00	NA	<3.342E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<8.144E00	NA	<8.296E00	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<1.092E00	NA	<1.150E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<1.144E00	NA	<1.233E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<1.006E01	NA	<9.968E00	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<3.451E00	NA	<3.745E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<2.454E00	NA	<2.595E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<4.439E00	NA	<4.389E00	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<2.241E00	NA	<2.190E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<2.681E00	NA	<2.805E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<3.397E01	NA	<2.872E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<5.329E00	NA	<4.706E00	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<3.176E01	NA	<3.109E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<6.680E00	NA	<6.666E00	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02202		M02204	
		05/ 21/ 03		05/ 21/ 03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	20	NA	21	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	6	NA	5.69	NA
	Conductivity (mmho/cm)	18	NA	14	NA
	Dissolved Oxygen (mg/L)	8.06	NA	9.06	NA
	Turbidity (NTU)	0	NA	1	NA
	Background Radiation (uR/hr)	10.24	NA	10.24	NA
Chemistry	Alkalinity (mg/L)	2.2	2.4	3.5	3.4
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	4.3	4.8	1.6	1.6
	pH, Lab (S.U.)	5.7	5.9	5.8	5.8
	Specific Conductance (@25C) (umhos/cm)	22.5	22.5	16.8	17.4
	Total Dissolved Solids (mg/L)	36	24	40	16
	Total Organic Carbon (mg/L)	<2.0	<2.0	2.7	2.8
	Bromide (mg/L)	<0.020	<0.020	0.16	<0.020
	Chloride (mg/L)	2.1	1.9	1.6	1.6
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	0.91	0.91	0.023	0.026
	Nitrate (mg/L)	0.91	0.91	0.023	0.026
	Ammonia Nitrogen (mg/L)	<0.050	<0.050	<0.050	<0.050
	Total Kjeldahl Nitrogen (mg/L)	0.23	0.22	0.22	0.22
	Phosphate, Ortho. (mg/L)	<0.020	<0.020	<0.020	<0.020
	Total Phosphorus (mg/L)	<0.020	<0.020	<0.020	<0.020
	Sulfate (mg/L)	<5.0	<5.0	<5.0	<5.0
Metals	Aluminum (mg/L)	<0.10	<0.10	<0.10	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Calcium (mg/L)	1.2	1.4	0.37	0.38
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.082	<0.020	<0.020	<0.020
	Lead (mg/L)	<0.0050	<0.0050	0.0076	0.0092
	Magnesium (mg/L)	0.31	0.31	0.16	0.16
	Manganese (mg/L)	<0.010	<0.010	<0.010	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	<1.0	<1.0	<1.0	<1.0
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.6	1.7	1.1	1.1
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	0.02	<0.010	1.7	1.8

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	M02202		M02204	
		05/21/03		05/21/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	335 115.00	NA	<193 NA
	Gross Alpha ± 2	(pCi/L) (sigma)	<MDA		<MDA
	MDA	(pCi/L)	1.43E+00		1.40E+00
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	<MDA		1.64E+01
	MDA	(pCi/L)	1.59E+00		2.06E+00
	Beryllium-7 ± 2	(pCi/L) (sigma)	<1.101E01	NA	<1.180E01 NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<1.107E00	NA	<1.189E00 NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.187E01	NA	<1.057E01 NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<1.087E00	NA	<1.134E00 NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<1.207E00	NA	<1.396E00 NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<1.099E00	NA	<1.100E00 NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<2.331E00	NA	<2.472E00 NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<1.235E00	NA	<1.303E00 NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<2.440E00	NA	<2.322E00 NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<1.559E00	NA	<1.579E00 NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<3.197E00	NA	<3.337E00 NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<8.736E00	NA	<8.852E00 NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<1.142E00	NA	<1.148E00 NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<1.094E00	NA	<1.127E00 NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<9.814E00	NA	<9.830E00 NA
	Europium-152 ± 2	(pCi/L) (sigma)	<3.595E00	NA	<3.693E00 NA
	Europium-154 ± 2	(pCi/L) (sigma)	<2.506E00	NA	<2.718E00 NA
	Europium-155 ± 2	(pCi/L) (sigma)	<4.477E00	NA	<4.432E00 NA
	Lead-212 ± 2	(pCi/L) (sigma)	<2.188E00	NA	<2.379E00 NA
	Lead-214 ± 2	(pCi/L) (sigma)	<2.878E00	NA	<2.857E00 NA
	Radium-226 ± 2	(pCi/L) (sigma)	<3.462E01	NA	<2.831E01 NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<5.014E00	NA	<5.096E00 NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<2.344E01	NA	<3.165E01 NA
	Americium-241 ± 2	(pCi/L) (sigma)	<6.590E00	NA	<6.664E00 NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02205		M02306	
		05/21/03		05/27/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	21.1	NA	20.8	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	6.29	NA	5.58	NA
	Conductivity (mmho/cm)	24	NA	22	NA
	Dissolved Oxygen (mg/L)	8.31	NA	8.63	NA
	Turbidity (NTU)	0	NA	6	NA
	Background Radiation (uR/hr)	10.24	NA	11.05	NA
Chemistry	Alkalinity (mg/L)	11	8.6	2.5	2.6
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	6.2	5.2	4.6	4.1
	pH, Lab (S.U.)	6.4	6.2	5.6	5.6
	Specific Conductance (@25C) (umhos/cm)	33.2	27.5	28.4	27.7
	Total Dissolved Solids (mg/L)	32	28	40	40
	Total Organic Carbon (mg/L)	2.5	2	<2.0	<2.0
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	1.6	1.8	1.7	1.6
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	0.036	0.021	0.023	0.024
	Nitrate (mg/L)	0.036	0.021	0.023	0.024
	Ammonia Nitrogen (mg/L)	<0.050	<0.050	0.05	<0.050
	Total Kjeldahl Nitrogen (mg/L)	0.21	0.24	0.14	*
	Phosphate, Ortho. (mg/L)	<0.020	<0.020	0.12	<0.020
	Total Phosphorus (mg/L)	<0.020	<0.020	<0.020	<0.020
	Sulfate (mg/L)	<5.0	<5.0	5.5	5.4
Metals	Aluminum (mg/L)	<0.10	<0.10	0.1	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	0.0003	<0.00010
	Calcium (mg/L)	2.1	1.7	1.4	1.2
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.03	<0.020	0.22	<0.020
	Lead (mg/L)	0.038	0.011	<0.0050	<0.0050
	Magnesium (mg/L)	0.24	0.22	0.28	0.26
	Manganese (mg/L)	<0.010	<0.010	0.013	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	<1.0	<1.0	<1.0	<1.0
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.5	1.5	1.6	1.7
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	2.9	2.6	1	0.92

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	M02205		M02306	
		05/21/03		05/27/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2 (pCi/L) (sigma)	<193	NA	<202	NA
	Gross Alpha ± 2 (pCi/L) (sigma)	<MDA		5.24E+00	
	MDA (pCi/L)	1.49E+00		1.51E+00	
	Gross Non-volatile Beta ± 2 (pCi/L) (sigma)	<MDA		2.41E+00	
	MDA (pCi/L)	1.59E+00		1.54E+00	
	Beryllium-7 ± 2 (pCi/L) (sigma)	<1.291E01	NA	<4.085E01	NA
	Sodium-22 ± 2 (pCi/L) (sigma)	<1.208E00	NA	<2.579E00	NA
	Potassium-40 ± 2 (pCi/L) (sigma)	<1.006E01	NA	<2.207E01	NA
	Manganese-54 ± 2 (pCi/L) (sigma)	<1.209E00	NA	<2.405E00	NA
	Cobalt-58 ± 2 (pCi/L) (sigma)	<1.386E00	NA	<3.743E00	NA
	Cobalt-60 ± 2 (pCi/L) (sigma)	<1.217E00	NA	<2.209E00	NA
	Zinc-65 ± 2 (pCi/L) (sigma)	<2.453E00	NA	<6.074E00	NA
	Yttrium-88 ± 2 (pCi/L) (sigma)	<1.255E00	NA	<3.398E00	NA
	Zirconium-95 ± 2 (pCi/L) (sigma)	<2.301E00	NA	<7.158E00	NA
	Ruthenium-103 ± 2 (pCi/L) (sigma)	<1.686E00	NA	<6.365E00	NA
	Antimony-125 ± 2 (pCi/L) (sigma)	<3.314E00	NA	<7.624E00	NA
	Iodine-131 ± 2 (pCi/L) (sigma)	<1.075E01	NA	<3.556E02	NA
	Cesium-134 ± 2 (pCi/L) (sigma)	<1.053E00	NA	<2.257E00	NA
	Cesium-137 ± 2 (pCi/L) (sigma)	<1.149E00	NA	<2.530E00	NA
	Cerium-144 ± 2 (pCi/L) (sigma)	<1.021E01	NA	<2.587E01	NA
	Europium-152 ± 2 (pCi/L) (sigma)	<3.683E00	NA	<8.116E00	NA
	Europium-154 ± 2 (pCi/L) (sigma)	<2.607E00	NA	<6.199E00	NA
	Europium-155 ± 2 (pCi/L) (sigma)	<4.503E00	NA	<1.397E01	NA
	Lead-212 ± 2 (pCi/L) (sigma)	<2.283E00	NA	<5.622E00	NA
	Lead-214 ± 2 (pCi/L) (sigma)	<2.473E00	NA	<6.138E00	NA
	Radium-226 ± 2 (pCi/L) (sigma)	<2.913E01	NA	<6.938E01	NA
	Actinium-228 ± 2 (pCi/L) (sigma)	<4.797E00	NA	<1.159E01	NA
	Thorium-234 ± 2 (pCi/L) (sigma)	<3.110E01	NA	<7.464E01	NA
	Americium-241 ± 2 (pCi/L) (sigma)	<6.947E00	NA	<5.523E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02305		M02302	
		05/27/03		05/28/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	20.2	NA	19.6	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	5.44	NA	7.13	NA
	Conductivity (mmho/cm)	28	NA	44	NA
	Dissolved Oxygen (mg/L)	8.66	NA	9.34	NA
	Turbidity (NTU)	0	NA	0	NA
	Background Radiation (uR/hr)	11.05	NA	5.1	NA
Chemistry	Alkalinity (mg/L)	1.8	1.8	15	14
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	6.1	6.6	19	19
	pH, Lab (S.U.)	5.4	5.4	6.5	6.5
	Specific Conductance (@25C) (umhos/cm)	33.6	33.4	50.4	49.1
	Total Dissolved Solids (mg/L)	34	36	50	48
	Total Organic Carbon (mg/L)	<2.0	<2.0	2.1	<2.0
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	1.6	1.5	1.6	1.8
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	<0.020	<0.020	0.029	0.03
	Nitrate (mg/L)	<0.020	<0.020	0.029	0.03
	Ammonia Nitrogen (mg/L)	<0.050	<0.050	<0.050	<0.050
	Total Kjeldahl Nitrogen (mg/L)	*	*	*	*
	Phosphate, Ortho. (mg/L)	<0.020	<0.020	<0.020	<0.020
	Total Phosphorus (mg/L)	<0.020	<0.020	<0.020	<0.020
	Sulfate (mg/L)	7.3	7.2	5.7	5.7
Metals	Aluminum (mg/L)	<0.10	<0.10	<0.10	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Calcium (mg/L)	2.1	2.3	7.6	7.4
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.055	0.046	<0.020	<0.020
	Lead (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.20	0.2	0.097	0.099
	Manganese (mg/L)	0.014	0.014	<0.010	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	<1.0	<1.0	<1.0	<1.0
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.2	1.2	1	1.1
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	1.2	1.1	0.018	0.021

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02305		M02302	
		05/27/03		05/28/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2 (pCi/L) (sigma)	<202	NA	<193	NA
	Gross Alpha ± 2 (pCi/L) (sigma)	1.34E+01		1.47E+00	
	MDA (pCi/L)	2.23E+00		1.01E+00	
	Gross Non-volatile Beta ± 2 (pCi/L) (sigma)	1.05E+00		1.12E+00	
	MDA (pCi/L)	1.95E+01		<MDA	
	Beryllium-7 ± 2 (pCi/L) (sigma)	2.31E+00		1.73E+00	
	Sodium-22 ± 2 (pCi/L) (sigma)	1.73E+00		<4.304E01	NA
	Potassium-40 ± 2 (pCi/L) (sigma)	<2.503E00	NA	<4.708E01	NA
	Manganese-54 ± 2 (pCi/L) (sigma)	<2.716E00	NA	<2.382E00	NA
	Cobalt-58 ± 2 (pCi/L) (sigma)	<3.552E00	NA	<3.924E00	NA
	Cobalt-60 ± 2 (pCi/L) (sigma)	<2.348E00	NA	<2.308E00	NA
	Zinc-65 ± 2 (pCi/L) (sigma)	<5.324E00	NA	<5.789E00	NA
	Yttrium-88 ± 2 (pCi/L) (sigma)	<3.323E00	NA	<3.193E00	NA
	Zirconium-95 ± 2 (pCi/L) (sigma)	<7.138E00	NA	<7.211E00	NA
	Ruthenium-103 ± 2 (pCi/L) (sigma)	<6.875E00	NA	<6.625E00	NA
	Antimony-125 ± 2 (pCi/L) (sigma)	<7.303E00	NA	<7.063E00	NA
	Iodine-131 ± 2 (pCi/L) (sigma)	<3.998E02	NA	<3.856E02	NA
	Cesium-134 ± 2 (pCi/L) (sigma)	<2.282E00	NA	<2.424E00	NA
	Cesium-137 ± 2 (pCi/L) (sigma)	<2.417E00	NA	<2.405E00	NA
	Cerium-144 ± 2 (pCi/L) (sigma)	<2.448E01	NA	<2.489E01	NA
	Europium-152 ± 2 (pCi/L) (sigma)	<7.668E00	NA	<7.640E00	NA
	Europium-154 ± 2 (pCi/L) (sigma)	<6.123E00	NA	<6.138E00	NA
	Europium-155 ± 2 (pCi/L) (sigma)	<1.385E01	NA	<1.334E01	NA
	Lead-212 ± 2 (pCi/L) (sigma)	<5.419E00	NA	<5.454E00	NA
	Lead-214 ± 2 (pCi/L) (sigma)	<6.118E00	NA	<5.939E00	NA
	Radium-226 ± 2 (pCi/L) (sigma)	<6.895E01	NA	<6.057E01	NA
	Actinium-228 ± 2 (pCi/L) (sigma)	<1.152E01	NA	<1.044E01	NA
	Thorium-234 ± 2 (pCi/L) (sigma)	<7.487E01	NA	<7.447E01	NA
	Americium-241 ± 2 (pCi/L) (sigma)	<5.536E01	NA	<5.472E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02304		Blind Dup-01	
		05/ 28/ 03		05/ 28/ 03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	20	NA	N/A	NA
	Alkalinity (mg/L)		NA	N/A	NA
	pH (S.U.)	5.16	NA	N/A	NA
	Conductivity (mmho/cm)	21	NA	N/A	NA
	Dissolved Oxygen (mg/L)	9.51	NA	N/A	NA
	Turbidity (NTU)	0	NA	N/A	NA
	Background Radiation (uR/hr)	5.1	NA	N/A	NA
Chemistry	Alkalinity (mg/L)	<1.0	<1.0	<1.0	<1.0
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	3.8	3.9	3.9	3.9
	pH, Lab (S.U.)	5.0	5	5.0	5.1
	Specific Conductance (@25C) (umhos/cm)	25.7	25.6	26.3	26
	Total Dissolved Solids (mg/L)	38	44	30	30
	Total Organic Carbon (mg/L)	<2.0	<2.0	<2.0	<2.0
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	1.7	1.7	1.6	1.5
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	0.021	0.025	0.022	0.024
	Nitrate (mg/L)	0.021	0.025	0.022	0.024
	Ammonia Nitrogen (mg/L)	<0.050	0.05	<0.050	<0.050
	Total Kjeldahl Nitrogen (mg/L)	*	*	*	*
	Phosphate, Ortho. (mg/L)	<0.020	<0.020	<0.020	<0.020
	Total Phosphorus (mg/L)	<0.020	<0.020	<0.020	<0.020
	Sulfate (mg/L)	5.3	5.5	5.3	5.6
Metals	Aluminum (mg/L)	<0.10	<0.10	<0.10	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Calcium (mg/L)	1.3	1.3	1.3	1.3
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.069	<0.020	0.083	<0.020
	Lead (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.14	0.15	0.15	0.15
	Manganese (mg/L)	<0.010	<0.010	<0.010	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	<1.0	<1.0	<1.0	<1.0
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.2	1.2	1.2	1.2
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	0.046	0.049	0.046	0.047

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	M02304		Blind Dup-01		
		05/28/03		05/28/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<193	NA	<202	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	2.58E+00		2.23E+00	
	MDA	(pCi/L)	1.13E+00		1.08E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	1.03E+00		1.04E+00	
	Manganese-54 ± 2	(pCi/L) (sigma)	1.75E+00		<MDA	
	Beryllium-7 ± 2	(pCi/L) (sigma)	1.49E+00		1.74E+00	
	Sodium-22 ± 2	(pCi/L) (sigma)	1.74E+00		<4.344E01	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.348E00	NA	<4.759E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.632E00	NA	<2.474E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<3.884E00	NA	<4.247E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.172E00	NA	<2.564E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<5.709E00	NA	<6.424E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<3.393E00	NA	<3.797E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<7.954E00	NA	<8.092E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<6.805E00	NA	<8.033E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<7.190E00	NA	<7.577E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<3.700E02	NA	+	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.354E00	NA	<2.437E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.637E00	NA	<2.567E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.606E01	NA	<2.514E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<7.932E00	NA	<8.084E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<6.211E00	NA	<6.288E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<1.326E01	NA	<1.400E01	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<5.391E00	NA	<5.573E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<5.291E00	NA	<5.680E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<6.954E01	NA	<6.160E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<9.964E00	NA	<1.155E01	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<7.656E01	NA	<7.457E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<5.662E01	NA	<5.679E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M02303		M06501	
		05/28/03		05/29/03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	21.1	NA	20.1	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	4.78	NA	7.13	NA
	Conductivity (mmho/cm)	17	NA	68	NA
	Dissolved Oxygen (mg/L)	9.86	NA	9.43	NA
	Turbidity (NTU)	0	NA	9	NA
	Background Radiation (uR/hr)	5.1	NA	10.2	NA
Chemistry	Alkalinity (mg/L)	<1.0	<1.0	37	36
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	2.3	2.3	33	33
	pH, Lab (S.U.)	5.0	5.1	6.6	6.5
	Specific Conductance (@25C) (umhos/cm)	22.3	21.8	80.8	78.1
	Total Dissolved Solids (mg/L)	30	32	66	64
	Total Organic Carbon (mg/L)	<2.0	<2.0	2.8	<2.0
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	1.6	1.6	1.9	1.9
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	0.021	<0.020
	Nitrate/Nitrite (mg/L)	0.028	0.028	0.06	0.075
	Nitrate (mg/L)	0.028	0.028	0.039	0.075
	Ammonia Nitrogen (mg/L)	<0.050	0.12	0.051	<0.050
	Total Kjeldahl Nitrogen (mg/L)	*	*	*	*
	Phosphate, Ortho. (mg/L)	<0.020	<0.020	0.10	<0.020
	Total Phosphorus (mg/L)	0.02	<0.020	0.057	0.038
	Sulfate (mg/L)	<5.0	<5.0	<5.0	<5.0
Metals	Aluminum (mg/L)	<0.10	<0.10	0.67	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	0.053	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	0.0001	0.00012	<0.00010	<0.00010
	Calcium (mg/L)	0.65	0.66	12	12
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.022	<0.020	2.9	<0.020
	Lead (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.16	0.16	0.84	0.84
	Manganese (mg/L)	<0.010	<0.010	0.018	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	<1.0	<1.0	<1.0	<1.0
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1	1	1.3	1.4
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	0.72	0.74	<0.010	<0.010

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	M02303		M06501		
		05/28/03		05/29/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<193	NA	<193	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	1.71E+00 9.90E-01		3.30E+00 1.45E+00	
	MDA	(pCi/L)	1.03E+00		1.32E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	2.23E+00 1.51E+00		<MDA	
	MDA	(pCi/L)	1.74E+00		1.72E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<4.478E01	NA	<4.455E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<2.761E00	NA	<2.610E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.306E01	NA	<2.257E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.611E00	NA	<2.628E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<4.177E00	NA	<4.083E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.380E00	NA	<2.281E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<5.930E00	NA	<6.204E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<3.354E00	NA	<3.336E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<8.009E00	NA	<7.579E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<6.742E00	NA	<6.558E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<7.342E00	NA	<7.201E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<4.557E02	NA	<4.555E02	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.391E00	NA	<2.205E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.572E00	NA	<2.499E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.510E01	NA	<2.572E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<8.171E00	NA	<8.013E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<6.021E00	NA	<6.374E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<1.380E01	NA	<1.348E01	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<5.288E00	NA	<5.553E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<5.984E00	NA	<6.267E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<6.624E01	NA	<6.966E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<1.037E01	NA	<1.064E01	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<7.320E01	NA	<7.238E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<5.526E01	NA	<5.671E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M06502		M06503	
		06/ 02/ 03		06/ 02/ 03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	20	NA	20.4	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	9.99	NA	7.25	NA
	Conductivity (mmho/cm)	170	NA	100	NA
	Dissolved Oxygen (mg/L)	8.9	NA	8.73	NA
	Turbidity (NTU)	0	NA	0	NA
	Background Radiation (uR/hr)	7.65	NA	7.65	NA
Chemistry	Alkalinity (mg/L)	79	79	40	39
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	85	82	34	34
	pH, Lab (S.U.)	8.0	7.9	6.7	6.8
	Specific Conductance (@25C) (umhos/cm)	191	188	113	111
	Total Dissolved Solids (mg/L)	130	130	84	86
	Total Organic Carbon (mg/L)	3.8	2.3	<2.0	3
	Bromide (mg/L)	<0.020	0.55	<0.020	<0.020
	Chloride (mg/L)	2.1	2.1	1.9	1.9
	Fluoride (mg/L)	0.11	0.1	0.18	0.16
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate (mg/L)	<0.020	<0.020	<0.020	<0.020
	Ammonia Nitrogen (mg/L)	<0.050	1.2	0.071	<0.050
	Total Kjeldahl Nitrogen (mg/L)	*	0.41	0.25	0.24
	Phosphate, Ortho. (mg/L)	0.17	0.17	0.45	0.45
	Total Phosphorus (mg/L)	0.16	0.14	0.28	0.3
	Sulfate (mg/L)	9.8	10	8.3	8
Metals	Aluminum (mg/L)	0.14	0.14	<0.10	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Calcium (mg/L)	33	32	13	13
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	0.012	<0.010
	Iron (mg/L)	<0.020	<0.020	0.18	0.19
	Lead (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.55	0.55	0.42	0.43
	Manganese (mg/L)	<0.010	<0.010	<0.010	<0.010
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	1.2	1.2	6.8	6.8
	Selenium (mg/L)	0.0029	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.5	1.5	2.3	2.3
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	<0.010	<0.010	0.2	0.18

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	M06502		M06503		
		06/02/03		06/02/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<193	NA	<193	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	2.96E+00		<MDA	
	MDA	(pCi/L)	1.63E+00			
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	1.66E+00		1.33E+00	
	MDA	(pCi/L)	1.72E+00		1.56E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<4.075E01	NA	<4.475E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<2.230E00	NA	<2.556E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.250E01	NA	<2.155E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.574E00	NA	<2.661E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<3.754E00	NA	<3.939E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.333E00	NA	<2.556E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<6.229E00	NA	<5.625E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<3.504E00	NA	<3.216E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<7.455E00	NA	<8.345E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<6.498E00	NA	<6.590E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<7.191E00	NA	<7.644E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<3.307E02	NA	<3.507E02	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.427E00	NA	<2.375E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.623E00	NA	<2.569E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.582E01	NA	<2.513E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<7.846E00	NA	<8.017E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<6.114E00	NA	<6.458E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<1.387E01	NA	<1.398E01	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<5.562E00	NA	<5.586E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<6.126E00	NA	<6.291E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<6.343E01	NA	<6.698E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<1.088E01	NA	<1.122E01	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<7.460E01	NA	<7.596E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<5.632E01	NA	<5.685E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	M06504		M06506	
		06/ 02/ 03		06/ 03/ 03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	21.3	NA	22.6	NA
	Alkalinity (mg/L)		NA		NA
	pH (S.U.)	6.72	NA	6.24	NA
	Conductivity (mmho/cm)	77	NA	49	NA
	Dissolved Oxygen (mg/L)	8.38	NA	12.1	NA
	Turbidity (NTU)	0	NA	0	NA
	Background Radiation (uR/hr)	7.65	NA	7.65	NA
Chemistry	Alkalinity (mg/L)	27	26	6.1	6
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	32	32	7.4	7.6
	pH, Lab (S.U.)	6.4	6.5	5.7	5.8
	Specific Conductance (@25C) (umhos/cm)	87.2	87	49	48.4
	Total Dissolved Solids (mg/L)	60	68	52	48
	Total Organic Carbon (mg/L)	<2.0	2	<2.0	<2.0
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	2.1	2.2	1.6	1.6
	Fluoride (mg/L)	0.16	0.17	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	<0.020	<0.020	0.022	<0.020
	Nitrate (mg/L)	<0.020	<0.020	0.022	<0.020
	Ammonia Nitrogen (mg/L)	0.14	0.14	<0.050	0.091
	Total Kjeldahl Nitrogen (mg/L)	*	*	*	*
	Phosphate, Ortho. (mg/L)	0.37	0.37	0.023	<0.020
	Total Phosphorus (mg/L)	0.33	0.24	0.049	0.023
	Sulfate (mg/L)	9.5	10	10	11
Metals	Aluminum (mg/L)	<0.10	<0.10	0.11	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Calcium (mg/L)	12	12	2.4	2.5
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.12	0.12	0.53	0.52
	Lead (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.59	0.58	0.33	0.34
	Manganese (mg/L)	<0.010	<0.010	0.024	0.024
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	1.2	1.2	1.2	1.2
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.5	1.5	1.1	1.1
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	0.65	0.61	4.9	5

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample Type:	M06504		M06506		
		06/02/03		06/03/03		
		Total	Dissolved	Total	Dissolved	
Radionuclides	Tritium ± 2	(pCi/L) (sigma)	<193	NA	<193	NA
	Gross Alpha ± 2	(pCi/L) (sigma)	<MDA		1.81E+00	
	MDA	(pCi/L)	1.22E+00		1.05E+00	
	Gross Non-volatile Beta ± 2	(pCi/L) (sigma)	3.37E+00		3.30E+00	
	MDA	(pCi/L)	1.55E+00		1.56E+00	
			1.72E+00		1.73E+00	
	Beryllium-7 ± 2	(pCi/L) (sigma)	<4.216E01	NA	<4.342E01	NA
	Sodium-22 ± 2	(pCi/L) (sigma)	<2.528E00	NA	<2.469E00	NA
	Potassium-40 ± 2	(pCi/L) (sigma)	<2.370E01	NA	<2.138E01	NA
	Manganese-54 ± 2	(pCi/L) (sigma)	<2.703E00	NA	<2.780E00	NA
	Cobalt-58 ± 2	(pCi/L) (sigma)	<3.858E00	NA	<4.198E00	NA
	Cobalt-60 ± 2	(pCi/L) (sigma)	<2.366E00	NA	<2.445E00	NA
	Zinc-65 ± 2	(pCi/L) (sigma)	<5.950E00	NA	<5.674E00	NA
	Yttrium-88 ± 2	(pCi/L) (sigma)	<2.964E00	NA	<3.413E00	NA
	Zirconium-95 ± 2	(pCi/L) (sigma)	<7.481E00	NA	<7.181E00	NA
	Ruthenium-103 ± 2	(pCi/L) (sigma)	<6.765E00	NA	<6.816E00	NA
	Antimony-125 ± 2	(pCi/L) (sigma)	<6.945E00	NA	<7.551E00	NA
	Iodine-131 ± 2	(pCi/L) (sigma)	<3.592E02	NA	<3.753E02	NA
	Cesium-134 ± 2	(pCi/L) (sigma)	<2.412E00	NA	<2.456E00	NA
	Cesium-137 ± 2	(pCi/L) (sigma)	<2.822E00	NA	<2.734E00	NA
	Cerium-144 ± 2	(pCi/L) (sigma)	<2.539E01	NA	<2.634E01	NA
	Europium-152 ± 2	(pCi/L) (sigma)	<7.895E00	NA	<7.924E00	NA
	Europium-154 ± 2	(pCi/L) (sigma)	<6.156E00	NA	<6.293E00	NA
	Europium-155 ± 2	(pCi/L) (sigma)	<1.409E01	NA	<1.424E01	NA
	Lead-212 ± 2	(pCi/L) (sigma)	<5.336E00	NA	<5.499E00	NA
	Lead-214 ± 2	(pCi/L) (sigma)	<6.011E00	NA	<6.135E00	NA
	Radium-226 ± 2	(pCi/L) (sigma)	<6.333E01	NA	<7.000E01	NA
	Actinium-228 ± 2	(pCi/L) (sigma)	<1.131E01	NA	<1.080E01	NA
	Thorium-234 ± 2	(pCi/L) (sigma)	<7.281E01	NA	<7.260E01	NA
	Americium-241 ± 2	(pCi/L) (sigma)	<5.764E01	NA	<5.393E01	NA

Ambient Groundwater Data, 2003

	Well Number: Sample Date: Sample type:	Blind Dup-02		M06507	
		06/ 03/ 03		06/ 03/ 03	
		Total	Dissolved	Total	Dissolved
Field Measurements	Temperature (C)	NA	NA	22.7	NA
	Alkalinity (mg/L)	NA	NA		NA
	pH (S.U.)	NA	NA	6.65	NA
	Conductivity (mmho/cm)	NA	NA	51	NA
	Dissolved Oxygen (mg/L)	NA	NA	9.36	NA
	Turbidity (NTU)	NA	NA	0	NA
	Background Radiation (uR/hr)	NA	NA	7.65	NA
Chemistry	Alkalinity (mg/L)	5.6	5.4	9.2	9.4
	Pth. Alkalinity (mg/L)	0	0	0	0
	Hardness (calculated) (mg/L)	7.6	7.6	14	14
	pH, Lab (S.U.)	5.7	5.8	6.1	6.1
	Specific Conductance (@25C) (umhos/cm)	48.3	48.2	52.7	52.3
	Total Dissolved Solids (mg/L)	48	56	50	48
	Total Organic Carbon (mg/L)	<2.0	<2.0	<2.0	<2.0
	Bromide (mg/L)	<0.020	<0.020	<0.020	<0.020
	Chloride (mg/L)	1.6	1.7	1.6	1.4
	Fluoride (mg/L)	<0.10	<0.10	<0.10	<0.10
	Nitrite (mg/L)	<0.020	<0.020	<0.020	<0.020
	Nitrate/Nitrite (mg/L)	<0.020	<0.020	0.025	<0.020
	Nitrate (mg/L)	<0.020	<0.020	0.025	<0.020
	Ammonia Nitrogen (mg/L)	0.058	0.12	0.064	0.11
	Total Kjeldahl Nitrogen (mg/L)	0.34	*	*	*
	Phosphate, Ortho. (mg/L)	0.03	<0.020	<0.020	<0.020
	Total Phosphorus (mg/L)	0.081	0.026	<0.020	<0.020
	Sulfate (mg/L)	11	10	10	9.9
Metals	Aluminum (mg/L)	0.12	<0.10	0.11	<0.10
	Antimony (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Arsenic (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
	Barium (mg/L)	<0.050	<0.050	<0.050	<0.050
	Boron (mg/L)	<0.10	<0.10	<0.10	<0.10
	Beryllium (mg/L)	<0.0030	<0.0030	<0.0030	<0.0030
	Cadmium (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010
	Calcium (mg/L)	2.5	2.5	5	4.9
	Chromium (mg/L)	<0.010	<0.010	<0.010	<0.010
	Cobalt (mg/L)	<0.020	<0.020	<0.020	<0.020
	Copper (mg/L)	<0.010	<0.010	<0.010	<0.010
	Iron (mg/L)	0.57	0.52	0.56	<0.020
	Lead (mg/L)	0.0067	<0.0050	<0.0050	<0.0050
	Magnesium (mg/L)	0.33	0.34	0.41	0.4
	Manganese (mg/L)	0.024	0.024	0.024	0.024
	Mercury (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Nickel (mg/L)	<0.020	<0.020	<0.020	<0.020
	Potassium (mg/L)	1.2	1.3	1.2	1.2
	Selenium (mg/L)	<0.0020	<0.0020	<0.0020	<0.0020
	Silver (mg/L)	<0.030	<0.030	<0.030	<0.030
	Sodium (mg/L)	1.1	1.2	1.4	1.4
	Thallium (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010
	Vanadium (mg/L)	<0.020	<0.020	<0.020	<0.020
	Zinc (mg/L)	5.2	5.1	2.2	1.9

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	Well Number: Sample Date: Sample type:	Blind Dup-02		M06507	
		06/03/03		06/03/03	
		Total	Dissolved	Total	Dissolved
Radionuclides	Tritium ± 2 (pCi/L) (sigma)	<202	NA	<193	NA
	Gross Alpha ± 2 (pCi/L) (sigma)	2.50E+00		4.07E+00	
	MDA (pCi/L)	1.17E+00		1.42E+00	
	Gross Non-volatile Beta ± 2 (pCi/L) (sigma)	1.10E+00		1.14E+00	
	MDA (pCi/L)	<MDA		2.18E+00	
	Beryllium-7 ± 2 (pCi/L) (sigma)	1.73E+00		1.51E+00	
	Sodium-22 ± 2 (pCi/L) (sigma)	<4.545E01	NA	<4.356E01	NA
	Potassium-40 ± 2 (pCi/L) (sigma)	<2.551E00	NA	<2.314E00	NA
	Manganese-54 ± 2 (pCi/L) (sigma)	<2.448E01	NA	<4.457E01	NA
	Cobalt-58 ± 2 (pCi/L) (sigma)	<2.588E00	NA	<2.630E00	NA
	Cobalt-60 ± 2 (pCi/L) (sigma)	<4.065E00	NA	<3.877E00	NA
	Zinc-65 ± 2 (pCi/L) (sigma)	<2.436E00	NA	<2.385E00	NA
	Yttrium-88 ± 2 (pCi/L) (sigma)	<5.437E00	NA	<5.747E00	NA
	Zirconium-95 ± 2 (pCi/L) (sigma)	<8.059E00	NA	<6.797E00	NA
	Ruthenium-103 ± 2 (pCi/L) (sigma)	<7.137E00	NA	<6.430E00	NA
	Antimony-125 ± 2 (pCi/L) (sigma)	<7.420E00	NA	<6.991E00	NA
	Iodine-131 ± 2 (pCi/L) (sigma)	<5.648E02	NA	<3.746E02	NA
	Cesium-134 ± 2 (pCi/L) (sigma)	<2.287E00	NA	<2.189E00	NA
	Cesium-137 ± 2 (pCi/L) (sigma)	<2.559E00	NA	<2.597E00	NA
	Cerium-144 ± 2 (pCi/L) (sigma)	<2.597E01	NA	<2.471E01	NA
	Europium-152 ± 2 (pCi/L) (sigma)	<8.085E00	NA	<7.737E00	NA
	Europium-154 ± 2 (pCi/L) (sigma)	<6.338E00	NA	<6.098E00	NA
	Europium-155 ± 2 (pCi/L) (sigma)	<1.409E01	NA	<1.343E01	NA
	Lead-212 ± 2 (pCi/L) (sigma)	<5.497E00	NA	<5.423E00	NA
	Lead-214 ± 2 (pCi/L) (sigma)	<6.082E00	NA	<5.706E00	NA
	Radium-226 ± 2 (pCi/L) (sigma)	<6.778E01	NA	<6.716E01	NA
	Actinium-228 ± 2 (pCi/L) (sigma)	<1.143E01	NA	<1.064E01	NA
	Thorium-234 ± 2 (pCi/L) (sigma)	<7.424E01	NA	<7.206E01	NA
	Americium-241 ± 2 (pCi/L) (sigma)	<5.635E01	NA	<5.601E01	NA

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Well Number:		P-29TD	P-30TA	P-30TC	DUP-01
Sample Date:		04/09/03	04/09/03	04/10/03	04/10/03
Field Measurements	Temperature (C)	19.3	19.5	18.7	
	pH (S.U.)	5.53	5.4	6.53	
	Conductivity (mS/cm)	28	16	40	
	Dissolved Oxygen (mg/L)	2.36	5.68	6.18	
	Turbidity (NTU)	0	11	0	
	Background Radiation (uR/hr)	10.2	6.8	11.05	
	Sample Radiation (uR/hr)				
	Total Uranium (ug/L)	4.95E-01	1.14E-01	2.31E-02	3.34E-02
	±2 (sigma)	5.1E-02	1.2E-02	2.5E-03	3.5E-03
	MDA (ug/L)	9.78E-03	9.78E-03	9.78E-03	9.78E-03
	Radium-226 (pCi/L)	2.54E-01	1.43E-01	4.75E+00	1.2E-01
	±2 (sigma)	2.2E-01	2.2E-01	1.1E+00	1.3E-01
	MDA (pCi/L)	3.95E-01	4.61E-01	1.95E-01	2.51E-01
	Radium-228 (pCi/L)	3.4E+00	1.05E+00	1.26E+00	7.48E-01
	±2 (sigma)	9.3E-01	4.9E-01	5.3E-01	4.2E-01
	MDA (pCi/L)	6.04E-01	6.86E-01	6.8E-01	6.52E-01

Well Number:		P-28TE	P-16TC	FC-2D	FC-2C
Sample Date:		04/10/03	04/15/03	04/15/03	04/15/03
Field Measurements	Temperature (C)	18.8	20.0	21.1	22.2
	pH (S.U.)	6.17	5.63	6.69	7.11
	Conductivity (mS/cm)	52	18	87	171
	Dissolved Oxygen (mg/L)	1.33	6.68	5.04	4.28
	Turbidity (NTU)	2	12.8	0.18	0.69
	Background Radiation (uR/hr)	15.3	9.35	11.05	11.05
	Sample Radiation (uR/hr)				
	Total Uranium (ug/L)	1.93E-02	2.89E-01	4.28E-02	4.44E-01
	±2 (sigma)	2.1E-03	3.0E-02	4.4E-03	4.6E-02
	MDA (ug/L)	9.78E-03	9.78E-03	9.78E-03	9.78E-03
	Radium-226 (pCi/L)	4.56E-01	7.68E-01	3.88E-03	2.99E-01
	±2 (sigma)	2.6E-01	3.4E-01	1.9E-01	2.3E-01
	MDA (pCi/L)	3.74E-01	4.66E-01	4.66E-01	4.09E-01
	Radium-228 (pCi/L)	1.06E+00	9.89E-01	7.77E-01	8.96E-01
	±2 (sigma)	5.0E-01	4.7E-01	4.4E-01	4.8E-01
	MDA (pCi/L)	6.94E-01	6.42E-01	6.72E-01	7.21E-01

Ambient Groundwater Data, 2003

Well Number: Sample Date:		P-17TA 04/16/03	P-16B 04/16/03	P-24TA 04/21/03	P-17TC 04/21/03
Field Measurements	Temperature (C)	21.3	18.5	21.6	22.0
	pH (S.U.)	5.37	4.9	7.22	6.03
	Conductivity (mS/cm)	38	15	65	5
	Dissolved Oxygen (mg/L)	0.11	9.3	0.05	8.81
	Turbidity (NTU)	0.54	0.16	6.24	0
	Background Radiation (uR/hr)	8.5	6.8	8.5	12.75
	Sample Radiation (uR/hr)				
	Total Uranium (ug/L)	5.88E-02	1.93E-02	5.0E-02	9.43E-03
	±2 (sigma)	6.1E-03	2.1E-03	5.2E-03	1.0E-03
	MDA (ug/L)	9.78E-03	9.78E-03	9.78E-03	9.78E-03
	Radium-226 (pCi/L)	2.22E+00	1.67E+00	8.43E-01	4.1E-01
	±2 (sigma)	6.1E-01	5.0E-01	3.2E-01	2.4E-01
	MDA (pCi/L)	3.59E-01	3.07E-01	3.12E-01	3.59E-01
	Radium-228 (pCi/L)	3.16E+00	2.21E+00	1.54E+00	4.37E-01
	±2 (sigma)	1.0E+00	8.7E-01	6.6E-01	6.1E-01
	MDA (pCi/L)	1.1E+00	1.22E+00	8.87E-01	1.18E+00
	Sample Radiation (uR/hr)				

Well Number: Sample Date:		P-24TC 04/22/03	P-24A 04/22/03	P-23B 04/22/03	P-23TC 04/22/03
Field Measurements	Temperature (C)	21.1	21.3	20.1	22.0
	pH (S.U.)	6.12	9.14	7.00	6.29
	Conductivity (mS/cm)	59	84	157	70
	Dissolved Oxygen (mg/L)	0.11	5.22	0.09	0.13
	Turbidity (NTU)	0.98	1.3	0.34	14.7
	Background Radiation (uR/hr)	10.2	10.2	11.07	11.07
	Sample Radiation (uR/hr)				
	Total Uranium (ug/L)	2.61E-02	1.54E-01	8.15E-02	3.77E-02
	±2 (sigma)	2.8E-03	1.8E-02	8.5E-03	4.0E-03
	MDA (ug/L)	9.78E-03	9.78E-03	9.78E-03	9.78E-03
	Radium-226 (pCi/L)	3.32E-01	3.89E-01	4.67E-01	1.47E+00
	±2 (sigma)	2.0E-01	2.1E-01	2.4E-01	4.6E-01
	MDA (pCi/L)	2.66E-01	2.43E-01	3.19E-01	3.19E-01
	Radium-228 (pCi/L)	1.32E+00	6.61E-01	6.86E-01	1.1E+00
	±2 (sigma)	5.9E-01	4.6E-01	4.7E-01	5.5E-01
	MDA (pCi/L)	7.93E-01	7.59E-01	7.73E-01	7.87E-01
	Sample Radiation (uR/hr)				

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Well Number: Sample Date:		P-23TA	P-26A	P-26TC	MO2302
Field Measurements	Temperature (C)	21.8	21.2	21.8	19.6
	pH (S.U.)	5.53	5.01	5.84	7.13
	Conductivity (mS/cm)	61.1	35.6	65.4	44
	Dissolved Oxygen (mg/L)	*	*	*	9.34
	Turbidity (NTU)	1.14	0.24	0.16	0
	Background Radiation (uR/hr)	10.21	24.6	24.6	5.1
	Sample Radiation (uR/hr)				
	Total Uranium (ug/L)	7.77E-03	1.89E-02	9.14E-03	2.17E-01
	±2 (sigma)	8.8E-04	2.0E-03	1.1E-03	2.2E-02
	MDA (ug/L)	9.78E-03	9.78E-03	9.78E-03	9.78E-03
	Radium-226 (pCi/L)	7.37E-02	7.17E-01	1.85E+00	8.05E-01
	±2 (sigma)	1.6E-01	3.1E-01	5.2E-01	3.3E-01
	MDA (pCi/L)	3.55E-01	3.62E-01	2.61E-01	3.77E-01
	Radium-228 (pCi/L)	1.37E+00	4.32E-01	6.79E-01	1.79E+00
	±2 (sigma)	5.8E-01	4.3E-01	4.5E-01	7.9E-01
	MDA (pCi/L)	7.34E-01	7.83E-01	7.51E-01	1.2E+00

Well Number: Sample Date:		MO6501	MO6502	MO6503	MO6504
	Temperature (C)	20.1	20.0	20.4	21.3
	pH (S.U.)	7.13	9.99	7.25	6.72
	Conductivity (mS/cm)	68	170	100	77
	Dissolved Oxygen (mg/L)	9.43	8.9	8.73	8.38
	Turbidity (NTU)	9	0	0	0
	Background Radiation (uR/hr)	10.2	7.65	7.65	7.65
	Sample Radiation (uR/hr)				
	Total Uranium (ug/L)	1.79E+00	8.91E-01	4.72E-02	3.36E-02
	±2 (sigma)	1.8E-01	9.2E-02	5.5E-03	3.9E-03
	MDA (ug/L)	9.78E-03	9.78E-03	9.78E-03	9.78E-03
	Radium-226 (pCi/L)	1.2E+00	7.97E-01	4.78E-02	1.76E-01
	±2 (sigma)	4.9E-01	3.8E-01	2.5E-01	2.0E-01
	MDA (pCi/L)	4.86E-01	3.86E-01	5.66E-01	3.84E-01
	Radium-228 (pCi/L)	1.77E+00	8.18E-01	1.99E+00	1.74E+00
	±2 (sigma)	7.9E-01	6.0E-01	7.6E-01	8.4E-01
	MDA (pCi/L)	1.19E+00	1.05E+00	9.95E-01	1.3E+00

Well Number: Sample Date:		MO6506	DUP-01	MO6507
	Temperature (C)	22.6		22.7
	pH (S.U.)	6.24		6.65
	Conductivity (mS/cm)	49		51
	Dissolved Oxygen (mg/L)	12.1		9.36
	Turbidity (NTU)	0		0
	Background Radiation (uR/hr)	7.65		7.65
	Sample Radiation (uR/hr)			
	Total Uranium (ug/L)	2.65E-02	5.97E-02	1.16E-01
	±2 (sigma)	3.3E-03	6.5E-03	1.2E-02
	MDA (ug/L)	9.78E-03	9.78E-03	9.78E-03
	Radium-226 (pCi/L)	1.01E+00	1.18E+00	1.52E+00
	±2 (sigma)	3.4E-01	4.2E-01	4.9E-01
	MDA (pCi/L)	1.98E-01	3.32E-01	3.48E-01
	Radium-228 (pCi/L)	1.76E+00	1.44E+00	2.5E+00
	±2 (sigma)	6.7E-01	5.9E-01	7.7E-01
	MDA (pCi/L)	8.14E-01	7.54E-01	7.25E-01

2.1.5 Summary Statistics

Ambient Groundwater, 2003

Analyte	Statistics	A	B	C	D
Alkalinity	Average	38.50	55.03	14.73	6.89
	Median	38.50	60.50	16.00	6.15
	Standard Deviation	2.12	30.73	8.36	4.35
Hardness	Average	25.00	59.58	14.35	6.63
	Median	33.00	67.00	16.00	5.25
	Standard Deviation	19.29	34.49	10.30	5.62
pH Lab	Average	6.37	7.45	6.15	5.96
	Median	6.60	7.45	6.40	5.90
	Standard Deviation	0.87	1.18	0.63	0.36
Specific Conductance	Average	65.53	136.07	49.01	34.53
	Median	80.80	149.00	49.50	33.20
	Standard Deviation	41.94	62.91	24.41	13.72
Total Dissolved Solids	Average	40.67	103.33	36.40	32.83
	Median	48.00	107.00	38.00	33.00
	Standard Deviation	29.69	52.53	13.18	12.01
Total Organic Carbon	Average	2.80	3.33	2.70	2.90
	Median	2.80	3.60	2.70	2.75
	Standard Deviation		0.71	0.85	0.48
Bromide	Average				0.16
	Median				0.16
	Standard Deviation				
Chloride	Average	2.17	2.18	1.75	1.67
	Median	1.90	2.20	1.70	1.60
	Standard Deviation	0.55	0.30	0.20	0.16
Fluoride	Average	0.15	0.15	0.16	
	Median	0.15	0.15	0.16	
	Standard Deviation		0.05		
Nitrite	Average	0.02			
	Median	0.02			
	Standard Deviation				
Nitrate/Nitrite	Average	0.45	0.11	0.16	0.03
	Median	0.63	0.11	0.11	0.03
	Standard Deviation	0.36		0.18	0.01
Nitrate	Average	0.45	0.11	0.28	0.03
	Median	0.63	0.11	0.12	0.03
	Standard Deviation	0.36		0.36	0.01

Summary Statistics

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	Average	0.07	0.08	0.11	0.07
	Median	0.05	0.08	0.10	0.06
	Standard Deviation	0.03	0.02	0.03	0.02
Ammonia Nitrogen	Average	0.21	0.19	0.16	0.18
	Median	0.21	0.19	0.13	0.20
	Standard Deviation		0.09	0.08	0.05
TKN	Average	0.12	0.19	0.15	0.06
	Median	0.12	0.14	0.10	0.05
	Standard Deviation	0.02	0.18	0.12	0.05
Ortho Phosphate	Average	0.08	0.18	0.11	0.04
	Median	0.08	0.16	0.08	0.04
	Standard Deviation	0.03	0.09	0.10	0.01
Total Phosphorus	Average	9.06	8.70	8.86	
	Median	9.80	9.50	10.00	
	Standard Deviation	1.10	2.18	1.94	
Sulfate	Average	0.67	0.14	0.11	0.14
	Median	0.67			0.11
	Standard Deviation				0.07
Aluminum	Average	0.05	0.08	0.07	
	Median	0.05	0.08	0.07	
	Standard Deviation			0.00	
Barium	Average	0.01		0.00	0.00
	Median	0.01		0.00	0.00
	Standard Deviation			0.00	0.00
Cadmium	Average	9.19	22.93	4.89	2.21
	Median	12.00	26.00	4.50	1.60
	Standard Deviation	7.61	13.58	3.97	2.16
Calcium	Average	2.90	0.29	1.54	2.62
	Median	2.90	0.18	1.75	0.53
	Standard Deviation		0.31	1.48	4.54
Iron	Average				
	Median				
	Standard Deviation				
Lead	Average			0.01	0.02
	Median			0.01	0.01
	Standard Deviation			0.01	0.02
Magnesium	Average	0.53	0.53	0.27	0.30
	Median	0.39	0.52	0.20	0.26
	Standard Deviation	0.27	0.17	0.15	0.14

Summary Statistics
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Manganese	Average	0.02	0.03	0.04	0.03
	Median	0.02	0.02	0.04	0.02
	Standard Deviation		0.03	0.01	0.02
Potassium	Average	1.40	2.42	2.62	2.30
	Median	1.40	1.40	1.70	1.20
	Standard Deviation		2.45	1.76	1.91
Silver	Average			1.40	
	Median			1.40	
	Standard Deviation			0.28	
Sodium	Average	1.60	1.75	1.48	1.59
	Median	1.30	1.75	1.30	1.30
	Standard Deviation	0.70	0.39	0.68	1.03
Zinc	Average	0.32	0.11	0.23	1.79
	Median	0.32	0.11	0.02	1.45
	Standard Deviation		0.13	0.30	1.46
Gross Alpha	Average	3.30	2.64	2.66	6.01
	Median	3.30	2.64	2.12	5.22
	Standard Deviation		0.46	1.90	3.93
Gross Nonvolatile Beta	Average		2.77	2.81	6.97
	Median		2.77	3.18	2.77
	Standard Deviation		1.28	0.77	7.56
Total Uranium	Average	0.62	0.27	0.12	0.06
	Median	0.04	0.12	0.03	0.05
	Standard Deviation	1.02	0.34	0.17	0.04
Tritium	Average	869.50	227.00	335.00	
	Median	869.50	227.00	335.00	
	Standard Deviation	269.41			
Radium 226	Average	0.96	0.45	1.13	0.97
	Median	1.20	0.43	0.61	0.93
	Standard Deviation	0.86	0.28	1.38	0.82
Radium 228	Average	1.59	0.91	1.38	1.90
	Median	1.77	0.75	1.18	1.65
	Standard Deviation	0.73	0.55	0.82	0.79

2.2 Drinking Water Quality Monitoring

2.2.1 Summary

The South Carolina Department of Health and Environmental Control (SCDHEC) Environmental Surveillance and Oversight Program (ESOP) was designed to enhance ongoing efforts of the agency to evaluate Department of Energy-Savannah River (DOE-SR) environmental monitoring programs, conduct independent monitoring, and educate the public. This project provides radiological monitoring of municipal and community drinking water systems adjacent to the Savannah River Site (SRS). ESOP will provide project data and results to the public as an independent source of information regarding DOE-SR activities and their potential impacts to public health and the environment.

RESULTS AND DISCUSSION

Water System Results

Based on a review of the analytical data, 7 of the 18 municipal and large community systems sampled quarterly had tritium activities above the lower limit of detection (LLD) (Section 2.2.4). Detectable activities ranged from 222 to 437 picocuries per liter (pCi/L). These tritium activities are measurable but not significant when compared with the 20,000 pCi/L United States Environmental Protection Agency (USEPA) Maximum Contaminant Level (MCL). All seven of these systems are north of SRS. Slightly elevated tritium activities in these systems are potentially due to rainwater infiltration into the shallow unconfined aquifer that is present in this area. Drinking Water Systems that were sampled are listed in Table 1., section 2.2.3.

Gamma-emitting radionuclides were not detected above the minimum detectable activity (MDA). Gross alpha was detected in 19 samples. All gross alpha samples were below the EPA MCL of 15 pCi/L. Nonvolatile beta was detected in 14 samples collected. With the exception of the City of Jackson, the source of the alpha and beta detects are unknown. If gross alpha and nonvolatile beta are detected at 5 pCi/L or more samples will be sent to a contract laboratory for further analysis. The Town of Jackson gross alpha and nonvolatile beta detects are due to radium. The town is currently working on adding a new well to alleviate the situation. All samples were below the EPA drinking water MCL of 4 mrem (8 pCi/L) for non-volatile beta.

Raw Water Results

Based on a review of the raw water data from the Savannah River, tritium was detected above the LLD in every monthly composite analyzed from the downstream raw water intakes (Beaufort-Jasper and City of Savannah). Tritium activity in these samples ranged from 279 to 926 pCi/L with an average of 590 pCi/L. One of the North Augusta raw water tritium composites was slightly above the LLD. Due to theft and tampering of samples, data is not available for sample location SAVR from August through December. Section 2.2.4 summarizes the tritium activities for the raw water composites.

In an effort to minimize the effects of river fluctuation in the data analysis, tritium activities were normalized to the average monthly river discharge at the United States Geological Survey

(USGS) gauging station near the Beaufort-Jasper intake. Normalizing data takes in account the average amount of water in the river per month. When the data is not normalized it assumes that the river stage and flow is always the same. However, normalizing the tritium data assumes the amount of tritium in the water is equal throughout the water column. Because of these assumptions with both methods of calculating the average tritium transported down the river, both the non-normalized and normalized data have been included in this report.

After normalizing the data, the two downstream intakes ranged from 239.88 to 11244.22 curies/month with an average of 1533.66 curies/month. The averages of the monthly composites were used to estimate the annual transport of tritium in the Savannah River. Based on ESOP sampling & normalizing the data, approximately 17090 curies of tritium were transported down the river during 2003. Both SRS and Vogtle Electrical Generating Plant (VEGP) contributed to the tritium concentration found in the Savannah River. An increased amount of rain was received from March through August of 2003. Streamflow during these months was 10 to 100 times greater than normal. The excess rain caused flooding in many areas, including SRS. Elevated amounts of tritium were detected in March of 2003 in both the City of Savannah and Beaufort Jasper normalized data only. Elevated amounts of tritium were not detected in the data before it was normalized. The estimated annual transport of tritium and the average curies/month does not include the SAVR data because a limited number of samples were received. Section 2.2.4 summarizes this data.

Gamma-emitting radionuclides were not detected above the MDA for the monthly raw water composite samples. Gross alpha was detected above the MDA in three samples with an average of 1.6 pCi/L. Gross nonvolatile beta activity was detected in six samples with an average of 5.8 pCi/L. Both gross alpha and nonvolatile beta were below the respective EPA MCLs. Analytical results for the raw water composite samples are summarized in section 2.2.4.

DOE-SR Data Comparison

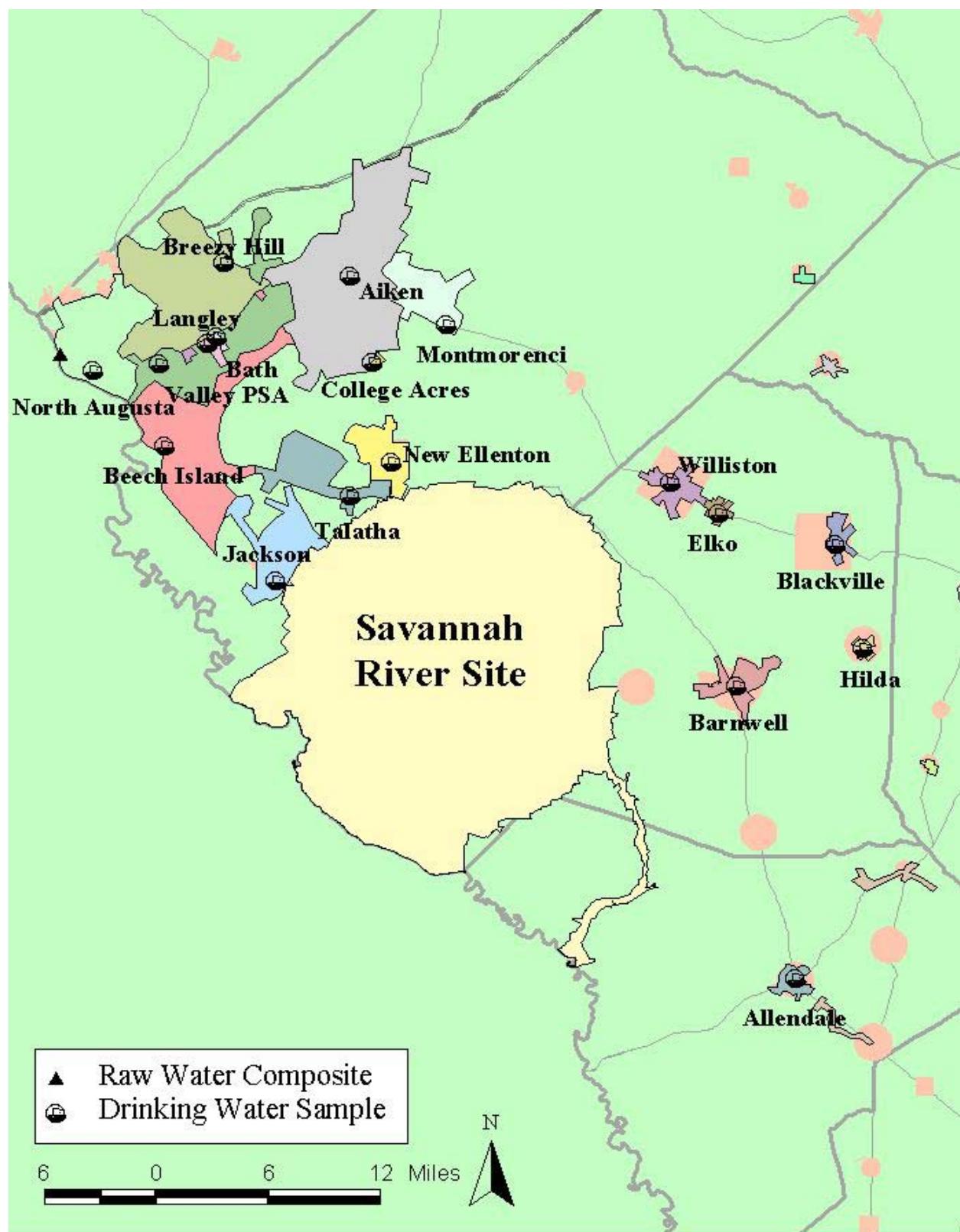
Based on sampling effort, DOE-SR estimates that 5910 curies of tritium were transported down the Savannah River in 2003. Before normalization of the data, ESOP estimates that 7164 curies of tritium were transported down the river. The difference in the estimated curies transported down the river may be due to the fact that ESOP's Savannah data was not included in the calculations. Therefore the results may be biased. Also, a difference in analysis procedures may have contributed to the data discrepancies. Gross alpha, nonvolatile beta, and gamma-emitting radionuclides detected by DOE-SR in 2003 were below ESOP MDAs (See Figure 1, section 2.2.3).

CONCLUSIONS / RECOMMENDATIONS

Tritium continues to be the most abundant radionuclide detected in public drinking water supplies impacted by SRS and VEGP. It was detected in both groundwater and surface water systems. However, these tritium activities were low compared to the EPA 20,000 pCi/L MCL. Gross alpha and gross non-volatile beta were detected at levels below their respective MCLs. ESOP will continue sampling to provide the public with an independent source of radiological data for drinking water systems surrounding SRS.

2.2.2

Map 3. Drinking Water Monitoring Locations

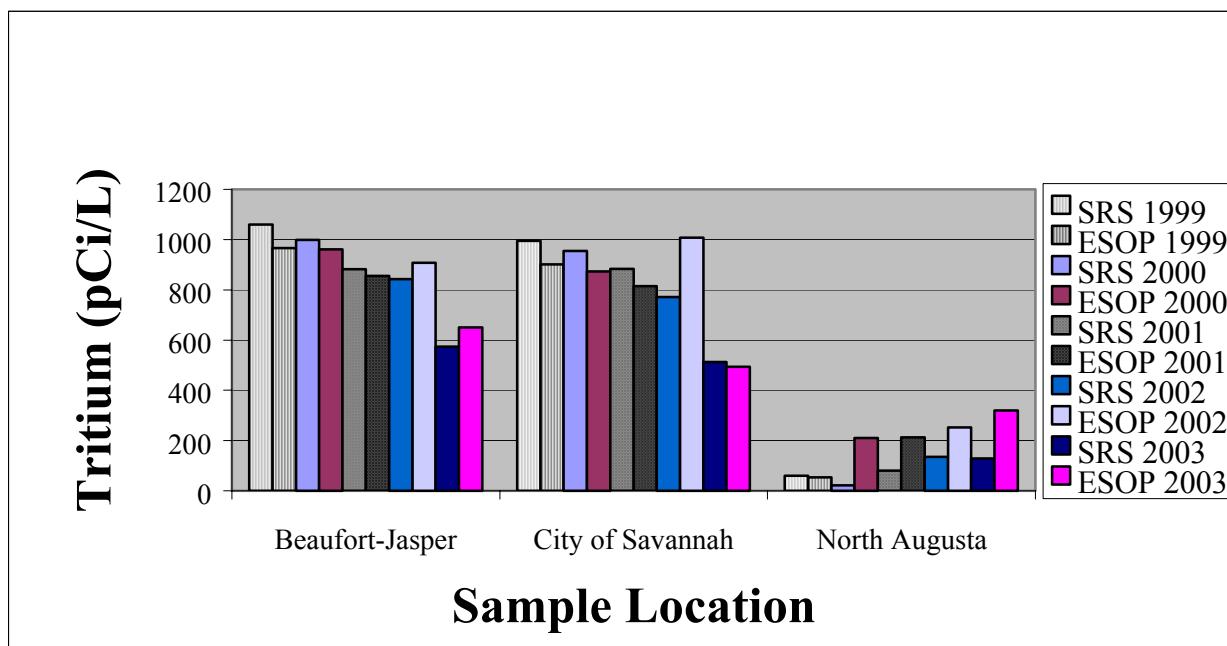


2.2.3 Tables and Figures

Drinking Water Quality Monitoring, 2003

Table 1. Drinking Water Systems sampled by ESOP in 2003.

System Number	System Name	Number of Taps	Population Served
210001	Aiken	14,889	36,064
210002	Jackson	1,460	3,942
210003	North Augusta	10,513	29,898
210007	New Ellenton	1,515	4,242
220001	Langley Water District	393	1,010
220002	College Acres Public Water District	520	1,350
220003	Bath Water District	375	1,064
220004	Beech Island	2,786	7,436
220005	Talatha Water District	591	1,595
220006	Breezy Hill Water District	3,963	12,354
220008	Montmorenci Water District	1,023	2,762
220012	Valley Public Service Authority	2,770	6,088
310001	Allendale	1,508	4,222
610001	Barnwell	2,065	6,201
610002	Williston	1,329	3,794
610003	Blackville	1,339	3,166
610004	Hilda	134	428
610005	Elko	165	462
210003	North Augusta Raw Water	--	--
720003	Beaufort-Jasper Raw Water	21,266	88,207
SAVR	City of Savannah Raw Water (Industrial)	35	10,619
	TOTAL	68,639	224,904
	Approx. Groundwater	54,369	96,180
	Approx. Surfacewater	31,814	128,724

Drinking Water Quality Monitoring, 2003**Figure 1. Average Tritium Concentration in the Savannah River.**

2.2.4 Data**Drinking Water Quality Monitoring Data, 2003**

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Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0210001			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L) ±2 (sigma)	1.56 1.12	<1.70	<1.61	2.5 1.26
	N-V Beta (pCi/L) ±2 (sigma)	<MDA		1.79 1.36	<1.80
	Tritium (pCi/L) ±2 (sigma)	NS	<195	<178	<194
	Iodine-131 (pCi/L) ±2 (sigma)	<86.38	<62.36	<67.38	<14.89
	Cesium-137 (pCi/L) ±2 (sigma)	<2.586	<1.136	<3.660	<3.540
	Radium-226 (pCi/L) ±2 (sigma)	<61.28	<33.82	<92.12	<78.81

System Number:		0210003			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L) ±2 (sigma)	NS	<1.56	NS	<1.58
	N-V Beta (pCi/L) ±2 (sigma)	NS	<1.77	NS	3.23 1.36
	Tritium (pCi/L) ±2 (sigma)	NS	<201	NS	NS
	Iodine-131 (pCi/L) ±2 (sigma)	<86.38	<156.5	NS	NS
	Cesium-137 (pCi/L) ±2 (sigma)	<2.586	<3.423	NS	NS
	Radium-226 (pCi/L) ±2 (sigma)	<61.28	<99.79	NS	NS

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0210002			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	7.97	10.3	6.40	11.15
	±2	1.84	2.25	2.07	2.19
	N-V Beta	<MDA	<1.75	1.72	<1.78
	±2			1.49	
	Tritium	<188	403	361	322
	±2		101	91	95
	Iodine-131	<114.7	<140.8	<32.76	<10.02
	±2				
	Cesium-137	<2.699	<3.408	<3.531	<3.863
	±2				
	Radium-226	<60.10	<95.63	<93.65	<84.59
	±2				

System Number:		0210007			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	<1.10	<1.40	<1.34	1.03
	±2				0.848
	N-V Beta	2.59	<1.59	<1.54	<1.79
	±2	1.34			
	Tritium	NS	<195	<178	<194
	±2				
	Iodine-131	<14.62	<40.37	<37.45	<12.14
	±2				
	Cesium-137	<2.602	<1.214	<3.461	<3.406
	±2				
	Radium-226	<60.87	<29.38	<97.16	<80.82
	±2				

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0220001			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L)	<1.13	<1.42	1.86	1.08
	±2 (sigma)			1.23	0.869
	N-V Beta (pCi/L)	<1.50	1.59	<1.54	<1.76
		±2 (sigma)	1.35		
	Tritium (pCi/L)	<188	226	<178	<194
		±2 (sigma)	92		
	Iodine-131 (pCi/L)	<89.58	<50.71	<26.15	<10.24
		±2 (sigma)			
Cesium-137	(pCi/L)	<2.707	<1.337	<3.405	<3.524
		±2 (sigma)			
Radium-226	(pCi/L)	<49.77	<28.66	<98.16	<81.72
		±2 (sigma)			

System Number:		0220003			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L)	<1.27	<1.68	<1.57	<1.10
	±2 (sigma)				
	N-V Beta (pCi/L)	<1.49	<1.58	3.30	<1.78
		±2 (sigma)		1.44	
	Tritium (pCi/L)	<188	<195	<178	<194
		±2 (sigma)			
	Iodine-131 (pCi/L)	<91.92	<46.59	<36.63	<9.055
		±2 (sigma)			
Cesium-137	(pCi/L)	<2.834	<1.163	<3.519	<3.711
		±2 (sigma)			
Radium-226	(pCi/L)	<60.47	<27.12	<94.20	<83.52
		±2 (sigma)			

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0220002			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	4.24	3.52	5.59	4.63
	±2	1.51	1.64	1.88	1.57
	N-V Beta	2.04	1.88	1.71	<1.80
		1.33	1.39	1.38	
	Tritium	437	316	<178	<194
		97	95		
	Iodine-131	<151.8	<35.98	<41.13	<35.43
	Cesium-137	<2.727	<1.201	<3.663	<3.511
	Radium-226	<50.56	<29.12	<93.07	<79.54

System Number:		0220004			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	NS	<1.73	<1.64	<1.20
	±2				
	N-V Beta	NS	<1.58	<1.58	<1.80
	Tritium	222	<195	<178	<194
		89			
	Iodine-131	NS	<46.78	<68.59	<11.94
	Cesium-137	NS	<1.201	<3.817	<3.433
	Radium-226	NS	<35.06	<97.41	<82.46

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0220005			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L)	<1.24	<1.57	<1.53	2.34
	±2 (sigma)				1.18
	N-V Beta (pCi/L) ±2 (sigma)	<1.49	<1.59	<1.56	<1.79
	Tritium (pCi/L) ±2 (sigma)	263	399	322	350
		90	99	95	96
	Iodine-131 (pCi/L) ±2 (sigma)	<118.5	<44.89	<71.92	<12.01
	Cesium-137 (pCi/L) ±2 (sigma)	<2.734	<1.065	3.584	<3.653
	Radium-226 (pCi/L) ±2 (sigma)	<48.56	<33.68	<93.50	<81.44

System Number:		0220008			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L)	<1.22	<1.50	<1.82	1.82
	±2 (sigma)				1.12
	N-V Beta (pCi/L) ±2 (sigma)	1.60	<1.76	<1.69	<1.79
		1.28			
	Tritium (pCi/L) ±2 (sigma)	<188	<201	233	<194
				85	
	Iodine-131 (pCi/L) ±2 (sigma)	<66.82	<11.60	<22.14	<5.148
	Cesium-137 (pCi/L) ±2 (sigma)	<2.622	<3.704	<3.743	<3.386
	Radium-226 (pCi/L) ±2 (sigma)	<49.25	<98.01	<98.40	<82.05

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0220006			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	<1.22	<1.57	<1.55	<1.78
	±2				
	N-V Beta	1.97	<1.77	<1.57	2.40
	±2	1.29			1.32
	Tritium	<188	<201	<178	<194
	±2				
	Iodine-131	<87.92	<134.4	<29.28	<27.83
	±2				
	Cesium-137	<2.554	<3.673	<3.168	<3.988
	±2				
	Radium-226	<59.54	<79.98	<93.27	<92.36
	±2				

System Number:		0220012			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	2.83	<1.58	<1.58	<1.55
	±2	1.80			
	N-V Beta	<1.49	<1.77	<1.57	<1.46
	±2				
	Tritium	<188	<201	<192	<202
	±2				
	Iodine-131	<103.2	<134.2	<37.41	<27.83
	±2				
	Cesium-137	<2.706	<3.300	<3.356	<3.997
	±2				
	Radium-226	<49.73	<9.434	<90.53	<86.31
	±2				

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0310001			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L) ±2 (sigma)	<2.04	<2.46	<3.36	<2.01
	N-V Beta (pCi/L) ±2 (sigma)	1.68	<1.83	<1.77	<1.86
	Tritium (pCi/L) ±2 (sigma)	1.27			
	Iodine-131 (pCi/L) ±2 (sigma)	<188	<201	<178	<194
	Cesium-137 (pCi/L) ±2 (sigma)	<112.9	<134.7	<31.33	<8.974
	Radium-226 (pCi/L) ±2 (sigma)	<2.598	<3.424	<3.723	<3.471

System Number:		0610002			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L) ±2 (sigma)	<1.34	<1.63	<2.09	<1.15
	N-V Beta (pCi/L) ±2 (sigma)	<1.49	<1.78	<1.72	<1.79
	Tritium (pCi/L) ±2 (sigma)	<188	<201	<178	<194
	Iodine-131 (pCi/L) ±2 (sigma)	<87.53	<186.7	<22.26	<6.063
	Cesium-137 (pCi/L) ±2 (sigma)	<2.851	<3.754	<3.847	<3.551
	Radium-226 (pCi/L) ±2 (sigma)	<60.81	<95.06	<93.58	<85.95

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0610001			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	<1.86	<1.74	<2.18	<1.46
	±2				
	N-V Beta	1.62	<1.79	<1.73	<1.83
	±2	1.27			
	Tritium	<188	<201	<178	<194
	±2				
	Iodine-131	<105.8	<23.24	<29.76	<8.804
	±2				
	Cesium-137	<2.630	<3.666	<3.680	<3.458
	±2				
	Radium-226	<61.56	<95.20	<92.85	<81.26
	±2				

System Number:		0610003			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	<2.19	<2.76	<3.67	<2.24
	±2				
	N-V Beta	<1.49	<1.84	<1.78	<1.86
	±2				
	Tritium	<188	<201	<178	<194
	±2				
	Iodine-131	<96.68	<170.2	<24.27	<8.637
	±2				
	Cesium-137	<28.31	<3.262	<3.805	<3.581
	±2				
	Radium-226	<61.11	<91.38	<88.92	<78.63
	±2				

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0610004			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L) ±2 (sigma)	NS	<1.56	<3.67	<1.18
	N-V Beta (pCi/L) ±2 (sigma)	NS	<1.77	<1.78	<1.79
	Tritium (pCi/L) ±2 (sigma)	NS	<201	<178	<194
	Iodine-131 (pCi/L) ±2 (sigma)	NS	<155.2	<31.48	<8.136
	Cesium-137 (pCi/L) ±2 (sigma)	NS	<3.443	<3.683	<3.607
	Radium-226 (pCi/L) ±2 (sigma)	NS	<98.65	<94.94	<65.93

System Number:		DWDUP01			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha (pCi/L) ±2 (sigma)	1.52	<1.89	<1.97	1.56
		1.07			1.28
	N-V Beta (pCi/L) ±2 (sigma)	<1.53	<1.80	<1.71	<1.84
	Tritium (pCi/L) ±2 (sigma)	<197	<201	<178	<192
	Iodine-131 (pCi/L) ±2 (sigma)	<32.68	<316.3	<37.29	<15.07
	Cesium-137 (pCi/L) ±2 (sigma)	<3.018	<3.628	<3.627	<3.676
	Radium-226 (pCi/L) ±2 (sigma)	<74.98	<96.27	<94.91	<82.02

Drinking Water Quality Monitoring, 2003
Drinking Water Systems Monitoring Data

System Number:		0610005			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	<1.52	<1.90	<2.49	1.56
	±2				1.29
	N-V Beta	<1.49	<1.80	<1.75	<1.84
	±2				
	Tritium	<188	<201	<178	<194
	±2				
	Iodine-131	<93.39	<180.5	<23.96	<6.652
	±2				
	Cesium-137	<2.631	<3.671	<3.608	<3.541
	±2				
	Radium-226	<59.83	<85.04	<99.82	<80.87
	±2				

System Number:		DWDUP02			
Date:		1Q03	2Q03	3Q03	4Q03
Radionuclides	Gross Alpha	<1.01	<1.56	<1.53	<1.58
	±2				
	N-V Beta	<1.54	<1.77	<1.57	<1.46
	±2				
	Tritium	<197	255	<178	<192
	±2		95		
	Iodine-131	<17.42	<263.6	<30.04	<34.97
	±2				
	Cesium-137	<2.855	<3.257	<34.95	<3.980
	±2				
	Radium-226	<73.36	<87.03	<96.04	<97.03
	±2				

Drinking Water Quality Monitoring, 2003

Raw Drinking Water Data

Sample Number:	0210003R				
Date:		January-03	February-03	March-03	April-03
Radionuclides	Gross Alpha ±2 (sigma)	<1.20	<1.23	<1.65	<1.53
	N-V Beta ±2 (sigma)	<1.58	<1.58	<1.66	<1.67
	Tritium ±2 (sigma)	<197	<197	<195	<195
	Iodine-131 ±2 (sigma)	*	<262.3	<215.2	<11.40
	Cesium-137 ±2 (sigma)	<2.636	<2.648	<1.437	<1.326
	Radium-226 ±2 (sigma)	<61.18	<50.26	<42.93	<37.66
Sample Number:	0210003R				
Date:		May-03	June-03	July-03	August-03
Radionuclides	Gross Alpha ±2 (sigma)	<1.52	<1.48	<1.92	<1.88
	N-V Beta ±2 (sigma)	<1.76	<1.76	<1.70	<1.70
	Tritium ±2 (sigma)	<201	<201	<198	<198
	Iodine-131 ±2 (sigma)	*	<199.3	<51.61	<32.27
	Cesium-137 ±2 (sigma)	<3.585	<3.254	<3.545	<3.423
	Radium-226 ±2 (sigma)	<91.93	<94.95	<83.69	<98.16
Sample Number:	0210003R				
Date:		September-03	October-03	November-03	December-03
Radionuclides	Gross Alpha ±2 (sigma)	<1.08	<1.10	<1.33	<1.49
	N-V Beta ±2 (sigma)	<1.54	4.47	<1.43	<1.45
	Tritium ±2 (sigma)	277	<192	<202	<202
	Iodine-131 ±2 (sigma)	<908.5	<62.13	<395.9	<25.04
	Cesium-137 ±2 (sigma)	<3.940	<3.567	<3.999	<3.988
	Radium-226 ±2 (sigma)	<97.56	<97.27	<91.90	<95.55

Drinking Water Quality Monitoring, 2003

Raw Drinking Water Data

Sample Number: 0720003R			January-03	February-03	March-03	April-03
Date:						
Radionuclides	Gross Alpha ±2 (sigma)	(pCi/L)	1.70	<1.32	<1.84	<1.83
			1.11			
	N-V Beta ±2 (sigma)	(pCi/L)	<1.53	<1.57	<1.66	22.70
						2.32
	Tritium ±2 (sigma)	(pCi/L)	905	793	699	431
			118	112	110	102
Radionuclides	Iodine-131 ±2 (sigma)	(pCi/L)	<48.13	<285.4	<108.8	<10.32
	Cesium-137 ±2 (sigma)	(pCi/L)	<2.758	<2.543	<1.302	<1.428
	Radium-226 ±2 (sigma)	(pCi/L)	<72.46	<60.20	<42.79	<44.47
Sample Number: 0720003R			May-03	June-03	July-03	August-03
Date:						
Radionuclides	Gross Alpha ±2 (sigma)	(pCi/L)	<2.13	<1.99	<2.08	1.70
						1.37
	N-V Beta ±2 (sigma)	(pCi/L)	<1.72	<1.71	<1.72	2.26
						1.39
	Tritium ±2 (sigma)	(pCi/L)	668	407	279	498
			110	99	97	103
Radionuclides	Iodine-131 ±2 (sigma)	(pCi/L)	*	<285.2	<42.87	<62.30
	Cesium-137 ±2 (sigma)	(pCi/L)	<3.814	<3.760	<3.364	<3.645
	Radium-226 ±2 (sigma)	(pCi/L)	<95.38	<97.70	<97.69	<94.12
Sample Number: 0720003R			September-03	October-03	November-03	December-03
Date:						
Radionuclides	Gross Alpha ±2 (sigma)	(pCi/L)	<1.22	1.45	<1.73	<1.02
				1.09		
	N-V Beta ±2 (sigma)	(pCi/L)	1.86	1.81	1.79	<2.64
			1.35	1.35	1.27	
	Tritium ±2 (sigma)	(pCi/L)	770	926	788	NS
			112	116	112	
Radionuclides	Iodine-131 ±2 (sigma)	(pCi/L)	<959.7	<62.88	<207.0	<114.4
	Cesium-137 ±2 (sigma)	(pCi/L)	<3.590	<3.875	<4.0	<3.270
	Radium-226 ±2 (sigma)	(pCi/L)	<95.30	<87.60	<91.84	<78.49

Drinking Water Quality Monitoring, 2003
Raw Drinking Water Data

Sample Number: SAVR		January-03	February-03	March-03	April-03
Date:	Radionuclides				
	Gross Alpha ±2 (sigma)	<1.22	<1.34	<1.96	<2.01
	N-V Beta ±2 (sigma)	<1.53	<1.57	<1.71	<1.71
	Tritium ±2 (sigma)	511 104	843 114	600 105	402 98
	Iodine-131 ±2 (sigma)	<49.26	<377.1	*	*
	Cesium-137 ±2 (sigma)	<2.814	<2.799	<3.773	<3.831
	Radium-226 ±2 (sigma)	<75.02	<59.94	<94.65	<92.17
Sample Number: SAVR					
Date:	Radionuclides	May-03	June-03	July-03	
	Gross Alpha ±2 (sigma)	<2.00	<1.60	<2.01	
	N-V Beta ±2 (sigma)	<1.71	<1.77	<1.71	
	Tritium ±2 (sigma)	390 97	348 100	366 99	
	Iodine-131 ±2 (sigma)	*	<160.7	<717.7	
	Cesium-137 ±2 (sigma)	<3.593	<3.618	<3.464	
	Radium-226 ±2 (sigma)	<91.21	<95.99	<95.10	

Drinking Water Quality Monitoring, 2003

Drinking Water System Tritium Data

City of Savannah					
Month	Tritium (pCi/L)	±2 (sigma)	Approximate Q (L/month)	Tritium Total Ci/month	±2 (sigma)
January-03	511	123	4.694E+11	240	58
February-03	843	118	5.625E+11	474	66
March-03	600	105	1.609E+13	9652	1689
April-03	402	112	1.587E+12	638	178
May-03	390	112	1.491E+12	581	167
June-03	348	120	1.675E+12	583	200
July-03	366	107	1.515E+12	554	162
August-03	NS	NS	1.156E+12	NS	NS
September-03	NS	NS	6.280E+11	NS	NS
October-03	NS	NS	6.747E+11	NS	NS
November-03	NS	NS	6.429E+11	NS	NS
December-03	NS	NS	8.218E+11	NS	NS
Mean	494.29		2.28E+12	1817.51	Ci/month
Estimated Annual				12723	Ci/year

North Augusta (Below LLD)					
Month	Tritium (pCi/L)	±2 (sigma)	Approximate Q (L/month)	Tritium Total Ci/month	±2 (sigma)
January-03	<197		4.694E+11	<LLD	--
February-03	<197		5.625E+11	<LLD	--
March-03	<195		1.609E+13	<LLD	--
April-03	<195		1.587E+12	<LLD	--
May-03	<201		1.491E+12	<LLD	--
June-03	<201		1.675E+12	<LLD	--
July-03	<198		1.515E+12	<LLD	--
August-03	<198		1.156E+12	<LLD	--
September-03	277	92	6.280E+11	173.95	--
October-03	<192		6.747E+11	<LLD	--
November-03	<202		6.429E+11	<LLD	--
December-03	<202		8.218E+11	<LLD	--
Mean	<LLD		2.28E+12	<LLD	Ci/month
Estimated Annual				<LLD	Ci/year

0720003R - Beaufort-Jasper					
Month	Tritium (pCi/L)	±2 (sigma)	Approximate Q (L/month)	Tritium Total Ci/month	±2 (sigma)
January-03	905	118	4.694E+11	425	55
February-03	793	112	5.625E+11	446	63
March-03	699	110	1.609E+13	11244	1769
April-03	431	102	1.587E+12	684	162
May-03	668	110	1.491E+12	996	164
June-03	407	99	1.675E+12	682	166
July-03	279	97	1.515E+12	423	147
August-03	498	103	1.156E+12	576	119
September-03	770	112	6.280E+11	484	70
October-03	926	116	6.747E+11	625	78
November-03	788	112	6.429E+11	507	72
December-03	NS	NS	8.218E+11	NS	NS
Mean	651.27		2.28E+12	1553.66	Ci/month
Estimated Annual				17090	Ci/year

2.2.5 Summary Statistics
Drinking Water Quality Monitoring, 2003
Surface Water Systems

Radionuclide:		Gross Alpha (pCi/L)				
Statistical Analysis:		Max	Min	Median	Mean	Std. Deviation
System Number:	0210003R	<MDA	<MDA	NA	NA	NA
	0720003R	1.7	1.45	1.7	1.6166667	0.14
	SAVR	<MDA	<MDA	NA	NA	NA
						7

Radionuclide:		N-V Beta (pCi/L)				
Statistical Analysis:		Max	Min	Median	Mean	Std. Deviation
System Number:	0210003R	4.47	4.47	NA	NA	NA
	0720003R	22.70	1.79	1.86	6.08	9.29
	SAVR	<MDA	<MDA	NA	NA	NA
						7

Radionuclide:		Tritium (pCi/L)				
Statistical Analysis:		Max	Min	Median	Mean	Std. Deviation
System Number:	0210003R	277	277	NA	NA	NA
	0720003R	926	279	699	651	216
	SAVR	843	348	402	494	178
						7

Notes:

1. NA= Not Applicable
2. N-V=Non-volatile
3. N= Number of data points used for calculations
4. Std.= Standard

Summary Statistics
Drinking Water Quality Monitoring, 2003
Drinking Water Systems

Radionuclide:		Gross Alpha (pCi/L)					
Statistical Analysis:		Maximum	Minimum	Median	Mean	Std Deviation	N
System Number:	0220001	1.86	1.08	NA	1.47	NA	2
	0210001	2.50	1.56	NA	2.03	NA	2
	0210002	11.15	6.40	9.14	8.96	2.17	4
	0220002	5.59	3.52	4.44	4.50	0.86	4
	DWDUP01	1.56	1.52	NA	1.54	NA	2

Radionuclide:		NVBeta (pCi/L)					
Statistical Analysis:		Maximum	Minimum	Median	Mean	Std Deviation	N
System Number:	0220002	2.04	1.71	1.88	1.88	0.17	3
	0220006	2.40	1.97	NA	2.19	NA	2

Radionuclide:		Tritium (pCi/L)					
Statistical Analysis:		Max	Mn	Median	Mean	Std Deviation	N
System Number:	0220005	399	263	336	333.5	56.76	4
	0210002	403	322	361	362	40.51	3
	0220002	437	316	NA	376.5	NA	2

Notes:

1. NA=Not Applicable
2. NV=Non-volatile
3. N=Number of data points used for calculations
4. Std=Standard

2.3 Radiological Surface Water and Sediment Surveillance

2.3.1 Summary

Surface water bodies on and adjacent to the Savannah River Site (SRS) continue to be the focus for monitoring and surveillance activities of the Environmental Surveillance & Oversight Program (ESOP) Radiological Surface Water & Sediment (RSW&S) Project. Accordingly, surface water and sediment samples are collected and analyzed for radionuclides, the results from which are compared to historical SRS data. In addition, project databases are enhanced, and trends of radionuclides in streams and sediments are characterized. These activities will allow the project to generate independent data that can be shared with the public.

The gathering of data is possible through the collection of surface water from ambient and enhanced sample locations. Seven automatic sampling devices are at enhanced locations from which water was collected three days per week and weekly from six ambient locations. These samples were analyzed for tritium and composited into station-specific monthly samples which were analyzed for gross alpha, gross beta, and gamma-emitting radionuclides. Stream water was collected once a month from five creek mouths at their confluence with the Savannah River. These river locations were monitored for tritium.

The enhanced surface water-monitoring program is intended to provide downstream drinking water customers with advance notice of the potential for increased tritium levels in the Savannah River as the result of a SRS release. This early detection facet is possible because of the continuous monitoring of six SRS streams that flow to the Savannah River. ISCO® automatic samplers collect 30 to 50 milliliters (ml) of stream water every 30 minutes. ESOP personnel collected these composite samples every Monday, Wednesday, and Friday. Samples were analyzed for tritium on the day of collection by the South Carolina Department of Health & Environmental Control (SCDHEC) Edisto Savannah District laboratory. Results from the tritium analysis were used to project tritium activity in the Savannah River. There were no releases above expected activities or that warranted regulatory action during this sampling period.

Tritium had been detected above background levels at all sample locations throughout 2003. Four Mile Creek and Pen Branch continue to present the highest levels of tritium activity. The measured tritium activity in each of these streams is greater than the United States Environmental Protection Agency (USEPA) maximum contaminant level (MCL) of 20,000 picocuries per liter (pCi/L) for drinking water. Tritium activity from all surface water sampling stations ranged from less than the lower limit of detection (LLD) to 207,067 pCi/L, with Four Mile Creek (SV-2045) having the highest activity. In addition, ESOP analysis of samples collected at the Four Mile Creek mouth (SV-2015) indicate that the public could be exposed to tritium activities greater than the 20,000 pCi/L drinking water MCL at that specific river location.

Analyses of gross alpha activity ranged from <0.89 minimum detectable activity (MDA) to 6.24 pCi/L. Upper Three Runs (SV-325) was again identified with the highest level of gross alpha activity. Gross beta activity ranged from <1.46 MDA to 9.03 pCi/L, with Four Mile Creek (SV-2039) having the highest measured gross beta activity. Cesium-137 (Cs-137) was detected only at SV-2039 with activity at 8.22 pCi/L.

This value is attributed to excessive rainfall in June that necessitated the release of water containing Cs-137 from an H-Area retention basin (Section 2.3.4).

Sediment samples were collected from the Savannah River and its tributaries in September 2003. The samples were collected from five to ten centimeters deep in the sediment layer. Collections were made using stainless steel spoons. Samples were dried and placed in 400 cubic centimeter plastic containers as described in the ESOP Field Monitoring Procedures. A sediment sample was taken from each surface water sampling location. A total of 18 samples were collected in 2003. Cesium-137 activity was detected in 16 of the 18 sediment samples collected. The activity ranged from <0.014 MDA to 6.95 picocuries per gram (pCi/g). The highest level of Cs-137 in sediment was detected from the mouth of Steel Creek (SV-2017). The results from samples collected at Beaver Dam Creek and Upper Three Runs were below the SCDHEC MDA.

The RSW&S Project will continue to collect and analyze surface water and sediment on and adjacent to the SRS. This monitoring effort will provide an improved understanding of radionuclide activities in the SRS surface waters and sediment and impart valuable information to human health exposure pathways.

RESULTS AND DISCUSSION

A summary of surface water data for each location is located in Section 2.3.4.

Tritium

Samples from SRS streams and the Savannah River were analyzed for tritium activity. As in previous years, Four Mile Creek and Pen Branch exhibited tritium activities that consistently exceeded the National Primary Drinking Water Standard of 20,000 pCi/L. Four Mile Creek receives effluent from F-Area, H-Area, and the Central Sanitary Wastewater Treatment Facility (CSWTF); stormwater runoff from E-Area, C-Area, F-Area, and H-Area; and leachate from seepage basins and the Old Radioactive Waste Burial Ground (ORWBG). Pen Branch receives discharges and stormwater runoff from K-Area. Most of the tritium in Pen Branch is attributed to groundwater seepage from K-Area. Upper Three Runs had the most varied activities of tritium. Upper Three Runs receives discharges from the Effluent Treatment Facility (ETF), which has treated low-level radioactive wastewater since 1994. Stormwater runoff from F-Area, H-Area, S-Area, and Z-Area also impact Upper Three Runs, by transferring contamination to waterways of the state. In addition, ground water that has migrated from E-Area outcrops into Upper Three Runs.

Tritium activity in the Savannah River at the confluences of the five SRS streams was also monitored on a monthly basis. Beaver Dam Creek, Steel Creek, and Lower Three Runs were consistently below 20,000 pCi/L. Three samples were collected each time from Four Mile Creek, one from the creek mouth, one from 30 feet downstream of the creek mouth, and one from 150 feet downstream of the creek mouth. Samples are taken at these three intervals in order to show the effect of the mixing zone created by the Savannah River flow. Most samples analyzed for Four Mile Creek exceeded 20,000 pCi/L. Although the tritium activity was elevated at Four Mile Creek, the EPA MCL was not exceeded at the Highway 301 Bridge.

Data trending shows the ESOP mean detected tritium activities are slightly lower than the DOE-SR means at three of the five colocated sampling sites (Figure 1., section 2.2.3). In addition, the graph illustrates the increase in tritium activities in Upper Three Runs since 1999. This is reportedly due to increased discharges from the ETF.

Cesium

Cs-137 activity was analyzed for the monthly composite samples collected from the nine stations. The only location where Cs-137 was found above the Minimum Detectable Activity (MDA) was at SV-2039 on October 29, 2003. The activity was 8.22 pCi/L, and was attributed to the discharge of Cs-137 contaminated water from the H-area retention basin on June 12, 2003 due to excessive rainfall.

Gross Alpha

Alpha-emitting radionuclides were detected at all nine locations where monthly composite samples were collected. All samples in which activity was detected were below the EPA MCL of 15 pCi/L for drinking water. Activity ranged from <0.89 pCi/L MDA to 6.24 pCi/L, with the highest value at Upper Three Runs.

Gross Beta

Beta-emitting radionuclides were detected in all nine locations where monthly composite samples were collected in 2003, as well. The activity ranged from 1.63 pCi/L to 9.03 pCi/L, with Four Mile Creek (SV-2039) recording the highest activity. The EPA MCL for beta particle activity is 50 pCi/L for drinking water. No sample exceeded the MCL for gross beta activity.

Other Radionuclides

Weekly composite samples were collected from Four Mile Creek (SV-2039) and provided to the Georgia Department of Natural Resources (GADNR). These samples were composited into thirteen (13) samples and analyzed for Iodine-129 (I-129). GADNR reports that I-129 activity ranges from 0.4 pCi/L to 1.6 pCi/L with the highest activity recorded during the period of July 30, 2003 through September 3, 2003.

Sediment

Cesium -137 activity was detected in 16 of the 18 sediment samples collected. The activity ranged from <0.014 MDA to 6.95 picocuries per gram (pCi/g). The highest level of Cs-137 in sediment was detected from the mouth of Steel Creek (SV-2017). The results from samples collected at Beaver Dam Creek and Upper Three Runs were below the SCDHEC MDA.

DOE-SR / ESOP Data Comparison

Surface Water

Data reported in this project was compared to DOE-SR reported results. Data comparisons are located in section 2.3.4. ESOP and DOE-SR colocated sampling sites were Upper Three Runs, Beaver Dam Creek, Four Mile Creek, Pen Branch, Steel Creek, Lower Three Runs, and Highway 301 Bridge. Tritium activities for all co-located sites were similar, within the same order-of-magnitude. The 2003 ESOP and DOE-SR tritium results were consistent with historically reported data values.

Gross alpha activity was detected in samples from co-located sites. A comparison of ESOP and DOE-SR results reveal similar and dissimilar levels of activity, with ESOP reporting higher levels of gross alpha activity at some locations and lower at others. These differences may be the result of differences in the number of samples analyzed from each location. ESOP analyzed 11 or 12 samples from each location in the year 2003 while DOE-SR analyzed 22 samples from five of the locations and 52 from the sixth. This variability in sample numbers generates conflicting arithmetic means.

The levels of gross beta activity are more similar between the two organizations' results with some slight differences in reported activity. The difference in the number of samples analyzed may again account for this variability.

ESOP detected Cs-137 activity at SV-2039 (8.22 pCi/L) and DOE-SR identified cesium in all five colocated sample locations, with the highest arithmetic mean value found at Four Mile Creek (3.11 pCi/L) and Lower Three Runs (1.89 pCi/L). This difference is possibly due to the dissimilarity of the MDAs used by the two agencies.

Sediment

ESOP and DOE-SR reported some dissimilarity between Cs-137 results in sediment samples in 2003. Five (5) sites had co-located samples: Upper Three Runs (SV-2011), Beaver Dam Creek (SV-2013), Lower Three Runs (SV-2053), Lower Three Runs creek mouth (SV-2020), and Highway 301 Bridge (SV-118). ESOP did not detect Cs-137 at SV-2011 while DOE-SR data reported (0.05 pCi/g). SV-2013 showed Cs-137 activity of 0.077 pCi/g and 0.725 pCi/g as reported by ESOP and DOE-SR, respectively. ESOP data showed activity at SV-2053 at 0.103 pCi/g and SV-2020 at 0.674 pCi/g as compared to DOE-SR results at 0.375 pCi/g and 0.167 pCi/g. Similar data results were seen between the DOE-SR (0.300 pCi/g) and ESOP (0.307 pCi/g) at Highway 301 Bridge. Data comparisons are located in Section 2.3.4.

CONCLUSIONS / RECOMMENDATIONS

Mean tritium activity at background locations, i.e., Jackson Boat Landing (SV-2010) and Upper Three Runs (SV-2027), was lower than mean tritium activity at the enhanced and ambient sample locations. Four Mile Creek (SV-2039) and Pen Branch (SV-2047) continued to have the highest levels of tritium activity. Four Mile Creek receives effluent from F-Area, H-Area, and the CSWTF; stormwater runoff from E-Area, C-Area, F-Area, and H-Area; and leachate from

seepage basins and the ORWBG. However, since the beginning of the phyto-remediation project at Four Mile Creek, tritium levels have decreased. Pen Branch receives discharges and stormwater runoff from K-Area. Most of the tritium in Pen Branch is attributed to groundwater seepage. Due to historical and current activities in these areas, these streams will continue to exhibit higher activities of tritium in relation to other sample locations. Upper Three Runs (SV-325) continues to display the most variation in tritium activity. This is a consequence of receiving discharges from the ETF upstream of this location. ETF treats wastewater with low levels of radioactive contaminants. Tritium activities from all co-located sites were found to be consistent with DOE-SR data.

All results for the public access locations downstream from SRS were below the EPA MCL of 20,000 pCi/L for drinking water. However, data reported from samples collected from the mouth of Four Mile Creek indicate that the public could be exposed to tritium activity greater than 20,000 pCi/L at that location.

Upper Three Runs exhibited the highest alpha activity in 2003. Elevated levels of beta-emitting radionuclides were again detected in Four Mile Creek. These levels are potentially due to the groundwater contamination from the ORWBG and the former seepage basins located in F-area and H-Area. Cs-137 was detected in one ESOP surface water sample collected from Four Mile Creek. This was attributed to the release of Cs-137 contaminated water from a retention basin in June due to excessive rainfall. DOE-SR and ESOP data show some dissimilarity, but are consistent with historical information.

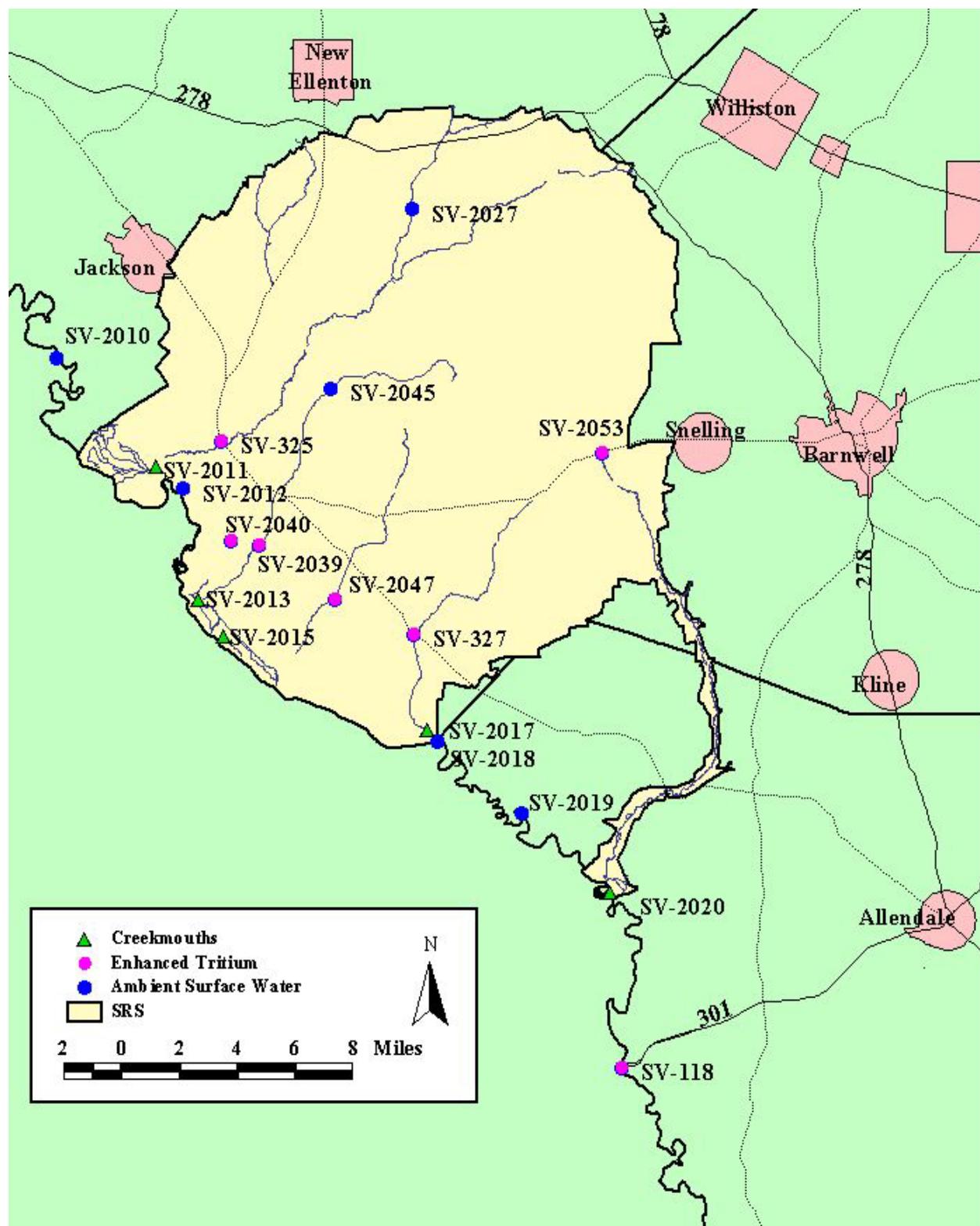
A sediment sample collected from the creek mouth of Steel Creek exhibited the greatest Cs -137 activity. Data from colocated samples exhibited some variability between ESOP and DOE-SR. The contributors to the discrepancies among data results, other than the variability in the number of samples analyzed, could be attributed to differences in laboratory methodology, field procedures, and/or sample size.

The data collected for enhanced surface water monitoring was used for tritium screening purposes only. These samples were not analyzed using ESOP Quality Assurance / Quality Control standards; therefore, the data were not considered releasable. There were no releases from the SRS above expected activities or that warranted regulatory action during the 2003 sampling period.

ESOP will continue independent monitoring of surface water and sediment. Monitoring will continue as long as there are activities at the SRS that create the potential for contamination entering the environment. Continued monitoring will provide an improved understanding of radionuclide activity in SRS surface waters and the Savannah River, and impart valuable information to human health exposure pathways. The comparison of data results allows for independent data verification of DOE-SR. Cooperation between DOE-SR and ESOP is a means of providing credibility and confidence in the information being provided to the public.

2.3.2

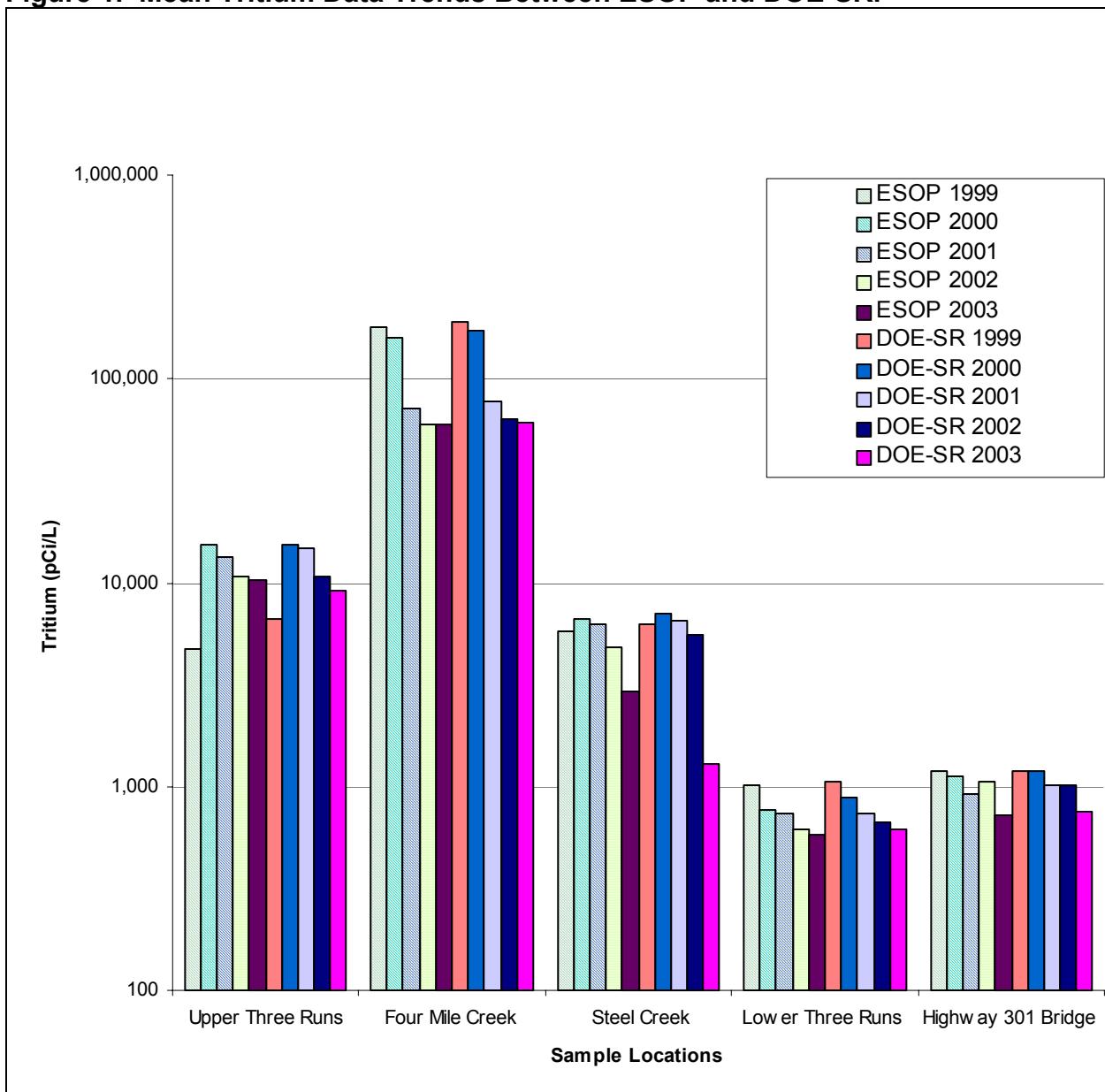
Map 4. Radiological Surface Water and Sediment Surveillance



2.3.3 Tables and Figures

Radiological Surface Water and Sediment Surveillance, 2003

Figure 1. Mean Tritium Data Trends Between ESOP and DOE-SR.



2.3.4 Data**Radiological Surface Water and Sediment Monitoring On
and Adjacent to the Savannah River Site, 2003**

Radiological Surface Water Monitoring Data, 2003.....	129
Radiological Surface Water Monitoring Boat Run Data, 2003.....	142
Radiological Sediment Data, 2003	144

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Jackson Boat Landing (SV-2010)											
Date	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- Sigma	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA
12/31/02	NR	NR	<MDA		1.19	<MDA		1.53	<MDA		3.04
01/08/03	<189										
01/15/03	<189										
01/22/03	<181										
01/29/03	<194		<MDA		1.06	<MDA		1.49	<MDA		2.81
02/05/03	<184										
02/12/03	<196										
02/19/03	<194										
02/26/03	<190		<MDA		1.82	3.01	1.49	1.66	<MDA		2.63
03/05/03	<186										
03/12/03	548	107									
03/19/03	381	100									
03/26/03	365	104	NS			NS			NS		
04/02/03	<199										
04/09/03	NS										
04/16/03	NS										
04/23/03	<199										
04/30/03	NS		<MDA		0.89	<MDA		1.52	<MDA		2.4
05/07/03	<186*										
05/14/03	<201**										
05/21/03	<191**										
05/28/03	<191**										
06/04/03	<201**		<MDA		1.25	<MDA		1.75	<MDA		2.45
06/11/03	214**	114									
06/18/03	<192**										
06/25/03	215**	112	2.04	1.23	1.31	<MDA		1.57	<MDA		3.27
07/02/03	<200**										
07/09/03	<200**										
07/16/03	NS										
07/23/03	<198**										
07/30/03	<200**		<MDA		1.76	3.28	1.47	1.62	<MDA		2.02
08/06/03	<196**										
08/13/03	<196**										
08/20/03	<196**										
08/27/03	264**	110	<MDA		1.8	1.64	1.38	1.63	<MDA		3.42
09/03/03	<188**										
09/10/03	<201**										
09/17/03	200**	89									
09/24/03	<209**										
10/01/03	<193**		1.21	1.00	1.18	<MDA		1.56	<MDA		3.82
10/08/03	<195										
10/15/03	<202										
10/22/03	<186										
10/29/03	211	93	<MDA		1.35	2.08	1.39	1.61	<MDA		3.69
11/05/03	<197										
11/12/03	<204										
11/19/03	<191										
11/26/03	196	91	<MDA		1.57	1.66	1.25	1.46	<MDA		1.9
12/03/03	216	87									
12/10/03	274	118									
12/17/03	NS										
12/24/03	NS										
12/31/03	<197***										

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Fourmile Branch @ Road C-7 (SV-2045)		
Date	Tritium	
	pCi/L	+/-2 Sigma
01/08/03	107168	1268
01/15/03	112260	1299
01/22/03	117337	1326
01/29/03	109361	1280
02/05/03	124650	1372
02/12/03	141239	1467
02/19/03	88651	1154
02/26/03	109165	1283
03/05/03	101396	1233
03/12/03	99238	1219
03/19/03	63782	968
03/26/03	78633	1081
04/02/03	92676	1179
04/09/03	51522	874
04/16/03	76287	1068
04/23/03	84745	1128
04/30/03	85614	1133
05/07/03	85968	1139
05/14/03	81193	1104
05/21/03	96314	1205
05/28/03	96585	1208
06/04/03	99258	1226
06/11/03	72233	1039
06/18/03	87665	1147
06/25/03	63956	975
07/02/03	35093	718
07/09/03	69126	1012
07/16/03	83205	1131
07/23/03	101131	1241
07/30/03	72358	1042
08/06/03	84531	1121
08/13/03	86666	1137
08/20/03	109042	1305
08/27/03	74350	1051
09/03/03	195167	1750
09/10/03	124118	1376
09/17/03	119027	1341
09/24/03	141906	1478
10/01/03	117795	958
10/08/03	134097	1022
10/15/03	141418	1049
10/22/03	139459	1041
10/29/03	144802	1068
11/05/03	146306	1060
11/12/03	146112	1062
11/19/03	75377	768
11/26/03	207067	1274
12/03/03	161210	1117
12/10/03	162064	1718
12/17/03	155403	1685
12/24/03	NS	
12/31/03	154760	1094

Sample Location: SRS TNX Boat Landing (SV-2012)		
Date	Tritium	
	pCi/L	+/-2 Sigma
01/08/03	457	121
01/15/03	389	117
01/22/03	322	109
01/29/03	221	110
02/05/03	571	124
02/12/03	585	130
02/19/03	1452	166
02/26/03	343	116
03/05/03	287	111
03/12/03	399	115
03/19/03	936	143
03/26/03	282	111
04/02/03	906	146
04/09/03	602	128
04/16/03	274	119
04/23/03	472	127
04/30/03	<189	
05/07/03	193	105
05/14/03	<201	
05/21/03	419	120
05/28/03	256	111
06/04/03	<201	
06/11/03	1130	158
06/18/03	213	110
06/25/03	287	116
07/02/03	<200	
07/09/03	200	112
07/16/03	431	123
07/23/03	<198	
07/30/03	420	124
08/06/03	<196	
08/13/03	219	111
08/20/03	379	120
08/27/03	424	120
09/03/03	566	126
09/10/03	509	129
09/17/03	199	108
09/24/03	287	121
10/01/03	258	92
10/08/03	1178	126
10/15/03	<202	
10/22/03	251	89
10/29/03	410	101
11/05/03	383	99
11/12/03	347	100
11/19/03	279	93
11/26/03	197	91
12/03/03	<183	
12/10/03	441	127
12/17/03	<193	
12/24/03	NS	
12/31/03	NS*	

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Upper Three Runs @ SC 125 (SV-325)											
Date	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- 2 Sigma	pCi/L	+/- 2 Sigma	MDA	pCi/L	+/- 2 Sigma	MDA	pCi/L	+/- 2 Sigma	MDA
12/31/02	NR	NR	1.72	1.00	1.03	<MDA		1.54	<MDA		2.87
01/08/03	14743	455									
01/15/03	13523	436									
01/22/03	12600	418									
01/29/03	9762	371	2.51	1.09	0.94	<MDA		1.51	<MDA		2.46
02/05/03	7933	334									
02/12/03	6706	311									
02/19/03	15012	463									
02/26/03	10815	393	<MDA		1.49	<MDA		1.67	<MDA		2.63
03/05/03	4092	247									
03/12/03	17776	502									
03/19/03	6652	311									
03/26/03	6355	305	<MDA		1.45	<MDA		1.67	<MDA		1.4
04/02/03	9542	370									
04/09/03	3277	227									
04/16/03	6342	310									
04/23/03	3159	225									
04/30/03	9859	377	2.43	1.01	0.8	<MDA		1.53	<MDA		2.7
05/07/03	7339	324				<MDA					
05/14/03	4322	257									
05/21/03	4363	257									
05/28/03	2663	210	6.24	1.65	1.12	2.42	1.56	1.75	<MDA		2.78
06/04/03	4577	264									
06/11/03	3504	237									
06/18/03	1891	184									
06/25/03	1114	155	2.83	1.28	1.21	<MDA		1.55	<MDA		3.48
07/02/03	1911	185									
07/09/03	1121	155									
07/16/03	9810	373									
07/23/03	15576	469									
07/30/03	8128	345	<MDA		1.55	<MDA		1.6	<MDA		1.93
08/06/03	13655	440									
08/13/03	6003	296									
08/20/03	12254	417									
08/27/03	8082	339	1.71	1.33	1.55	1.63	1.37	1.6	<MDA		3.94
09/03/03	15617	467									
09/10/03	20651	541									
09/17/03	10293	379									
09/24/03	15708	472									
10/01/03	17170	372	2.64	1.15	1.03	<MDA		1.53	<MDA		3.54
10/08/03	16925	370									
10/15/03	17758	380									
10/22/03	8184	263									
10/29/03	11368	308	1.71	1.08	1.18	<MDA		1.58	<MDA		3.36
11/05/03	12198	318									
11/12/03	12349	321									
11/19/03	8385	266									
11/26/03	14586	347	<MDA		1.4	1.92	1.27	1.44	<MDA		1.84
12/03/03	24536	439									
12/10/03	19371	558									
12/17/03	10113	404									
12/24/03	NS										
12/31/03*	24460	442									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Date	Sample Location: Beaver Dam Creek (SV-2040)										
	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- 2 Sigma	pCi/L	+/- 2 Sigma	MDA	pCi/L	+/- 2 Sigma	MDA	pCi/L	+/- 2 Sigma	MDA
12/31/02	NR	NR	<MDA		1.19	<MDA		1.53	<MDA		2.99
01/08/03	1067	149									
01/15/03	602	128									
01/22/03	1085	146									
01/29/03	930	144	<MDA		1.07	<MDA		1.49	<MDA		2.58
02/05/03	689	129									
02/12/03	586	130									
02/19/03	626	131									
02/26/03	844	140	<MDA		1.86	<MDA		1.66	<MDA		2.68
03/05/03	728	133									
03/12/03	585	125									
03/19/03	619	128									
03/26/03	715	133									
04/02/03	616	133	<MDA		1.66	<MDA		1.66	<MDA		1.47
04/09/03	863	140									
04/16/03	501	130									
04/23/03	703	137									
04/30/03	795	137	<MDA		0.91	2.36	1.33	1.52	<MDA		2.47
05/07/03	740	133									
05/14/03	410	123									
05/21/03	715	134									
05/28/03	499	124	<MDA		1.34	<MDA		1.74	<MDA		2.53
06/04/03	401	123									
06/11/03	715	137									
06/18/03	669	132									
06/25/03	539	127	1.39	1.17	1.39	2.19	1.38	1.58	<MDA		3.7
07/02/03	516	128									
07/09/03	502	127									
07/16/03	502	126									
07/23/03	674	135									
07/30/03	643	134	<MDA		1.76	2.95	1.45	1.62	<MDA		1.81
08/06/03	837	141									
08/13/03	682	134									
08/20/03	624	132									
08/27/03	817	138	<MDA		1.79	<MDA		1.63	<MDA		3.59
09/03/03	565	126									
09/10/03	1144	156									
09/17/03	903	142									
09/24/03	854	147									
10/01/03	1445	133	<MDA		1.23	<MDA		1.57	<MDA		3.62
10/08/03	946	118									
10/15/03	783	115									
10/22/03	878	113									
10/29/03	672	110	<MDA		1.39	1.97	1.39	1.62	<MDA		3.46
11/05/03	928	118									
11/12/03	794	116									
11/19/03	714	109									
11/26/03	603	106	<MDA		1.6	2.37	1.3	1.46	<MDA		1.78
12/03/03	949	114									
12/10/03	869	148									
12/17/03	501	131									
12/24/03	NS										
12/31/03*	1015	121									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Date	Sample Location: Four Mile Creek @ Road A-13 (SV-2039)										
	Tritium		Gross Alpha			Gross Beta		Cs-137			
			pCi/L	+/- Sigma	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA	
12/31/02	NR	NR	<MDA		1.08		6.06	1.58	1.54	<MDA	3.09
01/08/03	71213	1023									
01/15/03	76172	1060									
01/22/03	71502	1024									
01/29/03	69033	1007	<MDA		0.99		4.38	1.46	1.5	<MDA	2.9
02/05/03	67554	994									
02/12/03	70444	1022									
02/19/03	62287	959									
02/26/03	57699	918	<MDA		1.61		4.75	1.58	1.67	<MDA	2.92
03/05/03	54660	893									
03/12/03	53979	886									
03/19/03	47181	828									
03/26/03	42185	783									
04/02/03	51881	871	<MDA		1.5		4.16	1.55	1.67	<MDA	1.64
04/09/03	45675	817									
04/16/03	35450	717									
04/23/03	49409	851									
04/30/03	50227	859	1.22	0.81	0.85		5.68	1.53	1.52	<MDA	2.83
05/07/03	51292	867									
05/14/03	53938	892									
05/21/03	48504	843									
05/28/03	49862	856	<MDA		1.13		5.72	1.69	1.75	<MDA	2.84
06/04/03	58799	931									
06/11/03	47530	834									
06/18/03	39904	760									
06/25/03	32062	680	1.27	1.06	1.26		5.36	1.54	1.56	<MDA	3.97
07/02/03	42563	785									
07/09/03	34177	703									
07/16/03	46558	823									
07/23/03	41973	785									
07/30/03	54238	892	<MDA		1.62		4.94	1.55	1.61	<MDA	2.29
08/06/03	46328	820									
08/13/03	49820	852									
08/20/03	55740	905									
08/27/03	56046	908	<MDA		1.62		5.46	1.57	1.61	<MDA	3.99
09/03/03	52450	875									
09/10/03	62647	947									
09/17/03	64547	976									
09/24/03	60048	936									
10/01/03	63992	708	<MDA		1.06		7.79	1.64	1.54	<MDA	4.00
10/08/03	62885	702									
10/15/03	61826	695									
10/22/03	69865	737									
10/29/03	65603	717	<MDA		1.25		8.65**	1.72	1.6	8.22**	3.88
11/05/03	77775	771									
11/12/03	80225	788									
11/19/03	78850	783									
11/26/03	75081	767	<MDA		1.46		9.03	1.69	1.45	<MDA	2.02
12/03/03	85982	811									
12/10/03	89405	1246									
12/17/03	88431	1247									
12/24/03	NS										
12/31/03*	94341	854									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Pen Branch @ Road A-13 (SV-2047)											
Date	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/-2 Sigma	pCi/L	+/-2 Sigma	MDA	pCi/L	+/-2 Sigma	MDA	pCi/L	+/-2 Sigma	MDA
12/31/02	NR	NR	<MDA		1.13	<MDA		1.53	<MDA		2.85
01/08/03	86276	1135									
01/15/03	92374	1175									
01/22/03	91799	1169									
01/29/03	81874	1103	<MDA		1.05	1.6	1.28	1.5	<MDA		2.82
02/05/03	76790	1066									
02/12/03	71739	1031									
02/19/03	63843	973									
02/26/03	49722	854	<MDA		1.81	2.31	2.33	1.66	<MDA		2.63
03/05/03	39039	757									
03/12/03	40357	774									
03/19/03	33204	699									
03/26/03	23907	591									
04/02/03	43506	801	2.41	1.71	1.95	<MDA		1.66	<MDA		1.32
04/09/03	42058	790									
04/16/03	21770	566									
04/23/03	42112	791									
04/30/03	43322	802	3.31	1.38	1.09	1.99	1.33	1.51	<MDA		2.65
05/07/03	52268	882									
05/14/03	65441	990									
05/21/03	53009	889									
05/28/03	36301	734	2.84	1.5	1.49	<MDA		1.74	<MDA		2.73
06/04/03	70317	1026									
06/11/03	48728	854									
06/18/03	31127	677									
06/25/03	30234	664	3.21	1.61	1.6	2.6	1.43	1.6	<MDA		3.68
07/02/03	47543	839									
07/09/03	25420	612									
07/16/03	50096	858									
07/23/03	63370	970									
07/30/03	36306	733	<MDA		1.83	<MDA		1.63	<MDA		1.91
08/06/03	43043	797									
08/13/03	29331	656									
08/20/03	43455	800									
08/27/03	46111	824	<MDA		1.72	<MDA		1.62	<MDA		3.6
09/03/03	68616	1010									
09/10/03	67871	1001									
09/17/03	83495	1116									
09/24/03	94008	1187									
10/01/03	93665	855	2.2	1.22	1.22	2.62	1.4	1.56	<MDA		3.89
10/08/03	102036	890									
10/15/03	91886	845									
10/22/03	93714	853									
10/29/03	93319	853	<MDA		1.34	<MDA		1.61	<MDA		3.85
11/05/03	78143	774									
11/12/03	83269	805									
11/19/03	90179	838									
11/26/03	75721	771	<MDA		1.52	<MDA		1.46	<MDA		1.89
12/03/03	73325	751									
12/10/03	73412	1123									
12/17/03	60354	1017									
12/24/03	NS										
12/31/03*	73525	756									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Steel Creek @ SC 125 (SV-327)											
Date	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- Sigma	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA
12/31/02	NR	NR	<MDA		1.13	<MDA		1.53	<MDA		2.82
01/08/03	2402	197									
01/15/03	2489	200									
01/22/03	2593	201									
01/29/03	2070	187	1.15	0.89	1.02	<MDA		1.5	<MDA		2.57
02/05/03	2032	183									
02/12/03	1872	182									
02/19/03	2068	188									
02/26/03	1730	175	<MDA		1.75	<MDA		1.66	<MDA		2.6
03/05/03	1733	174									
03/12/03	1503	165									
03/19/03	1221	156									
03/26/03	2543	203									
04/02/03	1988	188	<MDA		1.62	<MDA		1.67	<MDA		1.41
04/09/03	2025	186									
04/16/03	3742	243									
04/23/03	6010	297									
04/30/03	2427	200	1.96	1.03	0.95	2.58	1.36	1.52	<MDA		2.74
05/07/03	2454	199									
05/14/03	3353	230									
05/21/03	4078	248									
05/28/03	6835	314	2.94	1.43	1.37	1.96	1.5	1.74	<MDA		2.7
06/04/03	3065	222									
06/11/03	2196	195									
06/18/03	5587	286									
06/25/03	4875	270	1.84	1.24	1.37	<MDA		1.58	<MDA		3.78
07/02/03	2216	196									
07/09/03	4731	268									
07/16/03	2116	191									
07/23/03	2126	192									
07/30/03	6278	303	<MDA		1.74	<MDA		1.62	<MDA		2.0
08/06/03	2935	218									
08/13/03	2966	218									
08/20/03	5456	284									
08/27/03	2144	190	<MDA		1.79	2.33	1.43	1.63	<MDA		3.62
09/03/03	2749	209									
09/10/03	2233	195									
09/17/03	2703	207									
09/24/03	2930	219									
10/01/03	3126	176	3.49	1.43	1.23	3.62	1.47	1.57	<MDA		3.7
10/08/03	3032	174									
10/15/03	2720	168									
10/22/03	3041	172									
10/29/03	2616	166	<MDA		1.35	<MDA		1.61	<MDA		3.64
11/05/03	2167	152									
11/12/03	2480	163									
11/19/03	2635	163									
11/26/03	2279	156	<MDA		1.53	<MDA		1.46	<MDA		1.97
12/03/03	2379	155									
12/10/03	2385	208									
12/17/03	2203	203									
12/24/03	NS										
12/31/03*	2702	171									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Steel Creek Landing @ RM 141 (SV-2018)											
Date	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- Sigma	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA
12/31/02	NR	NR	<MDA		1.17	<MDA		1.53	<MDA		2.86
01/08/03	2685	204									
01/15/03	941	143									
01/22/03	1019	144									
01/29/03	1016	148	<MDA		1.06	1.82	1.29	1.49	<MDA		2.65
02/05/03	2154	187									
02/12/03	2230	194									
02/19/03	3373	229									
02/26/03	3643	237	<MDA		1.71	<MDA		1.66	<MDA		2.83
03/05/03	5441	278									
03/12/03	4533	264									
03/19/03	2926	220									
03/26/03	6015	302									
04/02/03	2134	196	<MDA		1.68	2.71	1.47	1.66	<MDA		1.43
04/09/03	368	116									
04/16/03	7816	342									
04/23/03	1428	170									
04/30/03	<189	1.92	1.01	0.93	2.46	1.35	1.52	<MDA		2.49	
05/07/03	835	138									
05/14/03	7145	330									
05/21/03	7617	335									
05/28/03	9330	372	1.38	1.11	1.29	<MDA		1.75	<MDA		2.76
06/04/03	8228	351									
06/11/03	2232	201									
06/18/03	2897	220									
06/25/03	8782	376	<MDA		1.38	2.39	1.39	1.58	<MDA		3.67
07/02/03	437	125									
07/09/03	7104	330									
07/16/03	6011	302									
07/23/03	715	137									
07/30/03	2503	207	<MDA		1.74	<MDA		1.62	<MDA		1.61
08/06/03	256	113									
08/13/03	1702	176									
08/20/03	1468	168									
08/27/03	1064	149	<MDA		1.77	<MDA		1.62	<MDA		3.48
09/03/03	2101	188									
09/10/03	10049	378									
09/17/03	1230	156									
09/24/03	560	134									
10/01/03	513	102	<MDA		1.16	2.23	1.36	1.55	<MDA		3.78
10/08/03	2017	149									
10/15/03	360	100									
10/22/03	490	99									
10/29/03	1484	136	<MDA		1.36	2.22	1.4	1.61	<MDA		3.65
11/05/03	1994	148									
11/12/03	1760	145									
11/19/03	778	111									
11/26/03	484	102	<MDA		1.57	2.10	1.28	1.46	<MDA		2.02
12/03/03	490	98									
12/10/03	419	126									
12/17/03	<193										
12/24/03	NS										
12/31/03*	2031	150									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Little Hell Boat Landing (SV-2019)		
Date	Tritium	
	pCi/L	+/-2 Sigma
01/08/03	356	116
01/15/03	418	118
01/22/03	476	118
01/29/03	338	117
02/05/03	520	121
02/12/03	<196	
02/19/03	696	135
02/26/03	560	127
03/05/03	319	113
03/12/03	536	125
03/19/03	4510	266
03/26/03	4900	276
04/02/03	808	143
04/09/03	414	119
04/16/03	4670	271
04/23/03	274	116
04/30/03	443	120
05/07/03	556	125
05/14/03	4182	259
05/21/03	3560	238
05/28/03	6810	321
06/04/03	3778	246
06/11/03	1551	177
06/18/03	916	145
06/25/03	600	133
07/02/03	492	128
07/09/03	2244	200
07/16/03	3472	235
07/23/03	339	119
07/30/03	1007	151
08/06/03	690	135
08/13/03	1070	152
08/20/03	1240	159
08/27/03	879	141
09/03/03	923	143
09/10/03	9908	375
09/17/03	1474	165
09/24/03	1392	168
10/01/03	1050	121
10/08/03	1079	123
10/15/03	883	118
10/22/03	757	109
10/29/03	262	95
11/05/03	231	93
11/12/03	271	98
11/19/03	602	106
11/26/03	1145	125
12/03/03	943	115
12/10/03	491	130
12/17/03	352	123
12/24/03	NS	

Sample Location: Upper Three Runs @ Road 2-1 (SV-2027)		
Date	Tritium	
	pCi/L	+/-2 Sigma
01/08/03	264	110
01/15/03	256	110
01/22/03	283	107
01/29/03	301	114
02/05/03	<184	
02/12/03	244	112
02/19/03	256	112
02/26/03	223	109
03/05/03	214	106
03/12/03	288	109
03/19/03	303	112
03/26/03	273	110
04/02/03	250	115
04/09/03	285	113
04/16/03	193	115
04/23/03	<199	
04/30/03	353	115
05/07/03	407	118
05/14/03	<201	
05/21/03	326	115
05/28/03	328	115
06/04/03	<201	
06/11/03	372	121
06/18/03	340	117
06/25/03	253	113
07/02/03	264	117
07/09/03	322	119
07/16/03	NS	
07/23/03	240	114
07/30/03	334	119
08/06/03	318	117
08/13/03	310	116
08/20/03	288	115
08/27/03	395	118
09/03/03	358	115
09/10/03	274	117
09/17/03	242	110
09/24/03	301	122
10/01/03	399	98
10/08/03	353	97
10/15/03	275	97
10/22/03	316	92
10/29/03	219	94
11/05/03	220	92
11/12/03	263	97
11/19/03	508	102
11/26/03	216	92
12/03/03	<183	
12/10/03	407	126
12/17/03	<193	
12/24/03	NS	

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Date	Sample Location: US-301 Bridge (SV-118)										
	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- Sigma	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA
12/31/02	NR	NR	<MDA		1.21	<MDA		1.53	<MDA		2.9
01/08/03	830	139									
01/15/03	834	139									
01/22/03	945	140									
01/29/03	920	144	<MDA		1.06	<MDA		1.49	<MDA		2.59
02/05/03	669	128									
02/12/03	465	124									
02/19/03	1276	159									
02/26/03	1280	158	<MDA		1.68	<MDA		1.67	<MDA		2.65
03/05/03	1001	145									
03/12/03	645	128									
03/19/03	636	130									
03/26/03	489	123									
04/02/03	311	119	<MDA		1.65	<MDA		1.66	<MDA		1.39
04/09/03	485	122									
04/16/03	245	118									
04/23/03	281	117									
04/30/03	622	130	1.6	0.93	0.92	2.14	1.33	1.52	<MDA		2.54
05/07/03	503	122									
05/14/03	297	118									
05/21/03	484	123									
05/28/03	577	128	<MDA		1.24	<MDA		1.75	<MDA		2.9
06/04/03	498	128									
06/11/03	400	123									
06/18/03	370	119									
06/25/03	447	124	<MDA		1.36	2.09	1.37	1.58	<MDA		3.6
07/02/03	317	119									
07/09/03	452	126									
07/16/03	314	117									
07/23/03	415	123									
07/30/03	603	132	<MDA		1.74	2.68	1.44	1.62	<MDA		1.9
08/06/03	771	138									
08/13/03	531	127									
08/20/03	680	134									
08/27/03	1130	151	<MDA		1.8	3.33	1.48	1.63	<MDA		3.74
09/03/03	1106	150									
09/10/03	1298	162									
09/17/03	1672	172									
09/24/03	1259	163									
10/01/03	1082	122	1.81	1.27	1.41	3.99	1.49	1.59	<MDA		3.48
10/08/03	1056	122									
10/15/03	1077	124									
10/22/03	720	108									
10/29/03	528	105	1.59	1.23	1.43	<MDA		1.62	<MDA		3.38
11/05/03	808	114									
11/12/03	877	119									
11/19/03	830	113									
11/26/03	1118	125	<MDA		1.58	2.74	1.33	1.46	<MDA		1.92
12/03/03	933	114									
12/10/03	731	142									
12/17/03	620	137									
12/24/03	NS										
12/31/03*	624	108									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Lower Three Runs @ Road B (SV-2053)											
Date	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- 2 Sigma	pCi/L	+/- 2 Sigma	MDA	pCi/L	+/- 2 Sigma	MDA	pCi/L	+/- 2 Sigma	MDA
12/31/02	NR	NR	<MDA		1.07	<MDA		1.54	<MDA		3.17
01/08/03	599	127									
01/15/03	673	131									
01/22/03	643	126									
01/29/03	606	129	<MDA		0.99	<MDA		1.5	<MDA		2.93
02/05/03	824	135									
02/12/03	644	132									
02/19/03	610	130									
02/26/03	744	135	<MDA		1.62	<MDA		1.67	<MDA		2.72
03/05/03	626	127									
03/12/03	745	132									
03/19/03	630	128									
03/26/03	651	129									
04/02/03	501	127	<MDA		1.49	<MDA		1.67	<MDA		1.63
04/09/03	671	130									
04/16/03	439	126									
04/23/03	391	122									
04/30/03	524	124	0.92	0.72	0.83	<MDA		1.52	<MDA		2.71
05/07/03	719	132									
05/14/03	407	122									
05/21/03	606	129									
05/28/03	636	130	<MDA		1.14	<MDA		1.75	<MDA		2.93
06/04/03	314	118									
06/11/03	562	130									
06/18/03	418	120									
06/25/03	519	126	<MDA		1.21	<MDA		1.55	<MDA		3.99
07/02/03	435	124									
07/09/03	448	125									
07/16/03	542	128									
07/23/03	487	125									
07/30/03	395	122	<MDA		1.59	<MDA		1.6	<MDA		2.06
08/06/03	415	121									
08/13/03	534	127									
08/20/03	653	133									
08/27/03	534	125	<MDA		1.6	2.1	1.39	1.6	<MDA		3.98
09/03/03	484	122									
09/10/03	369	122									
09/17/03	635	132									
09/24/03	522	132									
10/01/03	583	104	1.36	0.956	1.06	2.06	1.34	1.54	<MDA		3.98
10/08/03	946	118									
10/15/03	586	108									
10/22/03	734	108									
10/29/03	960	120	<MDA		1.22	<MDA		1.59	<MDA		3.99
11/05/03	620	107									
11/12/03	638	111									
11/19/03	513	102									
11/26/03	591	107	<MDA		1.52	2.3	1.29	1.46	<MDA		1.96
12/03/03	633	104									
12/10/03	521	132									
12/17/03	457	129									
12/24/03	NS										
12/31/03*	493	103									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Duplicate #1											
Date	Tritium		Gross Alpha			Gross Beta			Cs-137		
	pCi/L	+/- Sigma	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA	pCi/L	+/- Sigma	MDA
12/31/02	NR	NR	<MDA		1.17	2.24	1.35	1.53	<MDA		3.03
01/08/03	1109	150									
01/15/03	626	129									
01/22/03	1235	153									
01/29/03	1017	148	1.54	1.01	1.09	2.2	1.32	1.49	<MDA		2.59
02/05/03	667	128									
02/12/03	463	124									
02/19/03	1198	156									
02/26/03	1131	152	<MDA		1.78	<MDA		1.66	<MDA		2.69
03/05/03	1849	178									
03/12/03	1470	163									
03/19/03	1068	152									
03/26/03	2619	205									
04/02/03	1759	180	<MDA		1.67	2.83	1.48	1.66	<MDA		1.34
04/09/03	745	134									
04/16/03	639	138									
04/23/03	521	129									
04/30/03	847	139	1.97	1.03	0.95	2.22	1.34	1.52	<MDA		2.66
05/07/03	772	135									
05/14/03	6979	327									
05/21/03	7441	331									
05/28/03	9059	367	1.48	1.09	1.25	<MDA		1.75	<MDA		2.61
06/04/03	464	126									
06/11/03	595	132									
06/18/03	711	134									
06/25/03	536	127	<MDA		1.33	<MDA		1.57	<MDA		3.76
07/02/03	361	121									
07/09/03	452	126									
07/16/03	334	118									
07/23/03	429	123									
07/30/03	686	136	<MDA		1.77	3.3	1.48	1.62	<MDA		2
08/06/03	242	113									
08/13/03	1704	176									
08/20/03	1434	167									
08/27/03	1070	149	2.72	1.47	1.56	<MDA		1.6	<MDA		3.88
09/03/03	15611	468									
09/10/03	20557	539									
09/17/03	10269	379									
09/24/03	16113	478									
10/01/03	17046	371	1.97	1.15	1.18	2.04	1.36	1.56	<MDA		3.53
10/08/03	<195										
10/15/03	<202										
10/22/03	<186										
10/29/03	<199		<MDA		1.35	2.25	1.41	1.61	<MDA		3.76
11/05/03	<197										
11/12/03	<204										
11/19/03	<191										
11/26/03	<195		1.72	1.25	1.43	<MDA		1.44	<MDA		1.83
12/03/03	24570	439									
12/10/03	19529	560									
12/17/03	9878	399									
12/24/03	NS										
12/31/03*	24329	440									

Radiological Surface Water Monitoring, 2003

Radiological Surface Water Data

Sample Location: Duplicate #2		
Date	Tritium	
	pCi/L	+/-2 Sigma
01/08/03	2336	195
01/15/03	2513	201
01/22/03	2594	201
01/29/03	2217	192
02/05/03	586	124
02/12/03	561	128
02/19/03	621	130
02/26/03	734	134
03/05/03	670	130
03/12/03	696	129
03/19/03	696	132
03/26/03	593	127
04/02/03	512	128
04/09/03	NS	
04/16/03	8225	352
04/23/03	<199	
04/30/03	287	112
05/07/03	6991	317
05/14/03	4257	255
05/21/03	4635	264
05/28/03	2500	205
06/04/03	470	127
06/11/03	442	125
06/18/03	383	119
06/25/03	411	122
07/02/03	342	118
07/09/03	455	125
07/16/03	502	126
07/23/03	377	120
07/30/03	494	127
08/06/03	689	135
08/13/03	473	124
08/20/03	829	141
08/27/03	979	145
09/03/03	1988	183
09/10/03	9845	374
09/17/03	1578	169
09/24/03	581	135
10/01/03	566	105
10/08/03	3301	184
10/15/03	2711	168
10/22/03	2825	167
10/29/03	2436	161
11/05/03	78936	779
11/12/03	78791	785
11/19/03	78643	782
11/26/03	74503	765
12/03/03	1006	116
12/10/03	676	139
12/17/03	556	133
12/24/03	NS	
12/31/03	633	108

Radiological Surface Water Monitoring, 2003

Boat Run Data

Sample Location: Upper Three Runs Mouth @ RM 157.2 (SV-2011)		
Date	Tritium	
	pCi/L	+/- Sigma
01/06/03	1417	131
02/03/03	978	116
03/03/03	872	117
04/14/03	731	113
05/05/03	5629	228
06/11/03	985	121
07/14/03	NS	
08/04/03	6589	243
09/08/03	2205	154
10/06/03	913	116
11/19/03	1147	125
12/08/03	8484	269

Sample Location: Beaver Dam Creek Mouth @ RM 152.1 (SV-2013)		
Date	Tritium	
	pCi/L	+/- Sigma
01/06/03	981	118
02/03/03	442	96
03/03/03	723	112
04/14/03*	<196	
05/05/03	575	105
06/11/03	449	100
07/14/03	NS	
08/04/03	1066	125
09/08/03	1171	125
10/06/03	556	104
11/19/03	351	97
12/08/03	1580	137

Sample Location: Four Mile Creek @ RM 150.6 (SV-2015)						
Date	Tritium (at Creek Mouth (CM))		Tritium (30 Feet from CM)		Tritium (150 Feet from CM)	
	pCi/L	+/- Sigma	pCi/L	+/- Sigma	pCi/L	+/- Sigma
01/06/03	69578	736	60487	687	618	105
02/03/03	66922	723	65640	716	8448	267
03/03/03	36483	538	17268	375	506	104
04/14/03*	227	93	<196		271	95
05/05/03	10286	298	8643	275	8114	267
06/11/03	751	111	578	105	435	100
07/14/03	NS		NS		NS	
08/04/03	7941	263	531	106	538	107
09/08/03	57393	674	28013	473	367	97
10/06/03	60273	687	10593	297	<192	
11/19/03	71488	746	8357	266	35675	529
12/08/03	80909	788	35170	524	10522	294

Radiological Surface Water Monitoring, 2003
Boat Run Data

Sample Location: Steel Creek Mouth @ RM 141.8 (SV-2017)		
Date	Tritium	
	pCi/L	+/- Sigma
01/06/03	17509	375
02/03/03	19294	393
03/03/03	16681	370
04/14/03*	320	98
05/05/03	4637	219
06/11/03	1501	137
07/14/03	NS	
08/04/03	3021	188
09/08/03	7652	267
10/06/03	1029	121
11/19/03	7623	260
12/08/03	5295	218

Sample Location: Lower Three Runs Mouth @ RM 129.1 (SV-2020)		
Date	Tritium	
	pCi/L	+/- Sigma
01/06/03	998	118
02/03/03	890	113
03/03/03	347	99
04/14/03	451	103
05/05/03	935	118
06/11/03	517	105
07/14/03	NS	
08/04/03	892	121
09/08/03	853	115
10/06/03	1026	120
11/19/03	1065	122
12/08/03	859	115

Radiological Surface Water Monitoring, 2003
Radiological Sediment Monitoring

Date: 10/03/2003	Cs-137	Pu-239/40	Qualifier	09/08/03	Cs-137	Pu-239/40	Qualifier
SV-2010 +/-2 Sigma MDA	0.0294 0.0126 0.0169	<MDA 0.048	U	SV-2011 +/-2 Sigma MDA	<MDA 0.0121	<MDA 0.0483	U
SV-325 +/-2 Sigma MDA	0.0583 0.0183 0.0185	<MDA 0.025	U	SV-2013 +/-2 Sigma MDA	0.0769 0.025 0.027	<MDA 0.0503	U
SV-2039 +/-2 Sigma MDA	0.538 0.0533 0.015	<MDA 0.025	U	SV-2015 +/-2 Sigma MDA	0.0454 0.0173 0.0168	<MDA 0.0366	U
SV-2047 +/-2 Sigma MDA	0.0345 0.0132 0.012	<MDA 0.0144	U	SV-2017 +/-2 Sigma MDA	6.952 0.629 0.0222	<MDA 0.0144	U
SV-327 +/-2 Sigma MDA	0.434 0.0443 0.0111	<MDA 0.0178	U	SV-2020 +/-2 Sigma MDA	0.6741 0.0685 0.0235	<MDA 0.0464	U
SV-118 +/-2 Sigma MDA	0.307 0.0401 0.0235	<MDA 0.0209	U				
SV-2053 +/-2 Sigma MDA	0.103 0.0166 0.0138	<MDA 0.0252	U				
SV-2027 +/-2 Sigma MDA	0.372 0.0494 0.04	0.0442 0.04 0.024	J				

2.3.5 Summary Statistics Radiological Surface Water Monitoring, 2003

Surface Water Tritium Data

Sample Location	Min. Conc. (pCi/L)	Max. Conc. (pCi/L)	Mean Conc. (pCi/L)	# of Samples	# of Detects
Jackson Landing (SV-2010)	181	548	313	46	11
Upper Three Runs (SV-2027)	183	508	298	50	44
<i>Upper Three Runs (SV-325)</i>	1114	24536	10277	51	51
<i>U3R at Road A**</i>	1380	17700	9110	22	NR
Upper Three Runs (SV-2011) Creek Mouth	731	8484	2723	11	11
TNX Boat Landing (SV-2012)	183	1452	448	50	41
Beaver Dam Creek (SV-2040)	401	1445	737	51	51
<i>Beaver Dam Creek (SV-2013)</i> <i>Creek Mouth</i>	196	1580	718	11	10
<i>Four Mile Creek (SV-2039)</i>	32062	94341	59213	51	51
<i>FM-6 Road A-12.2**</i>	40000	93200	60900	22	NR
Four Mile Creek (SV-2045)	35093	207067	108010	51	51
Four Mile Creek (SV-2015) Creek Mouth	227	80909	42023	11	11
Four Mile Creek (SV-2015) 30' downstream from creek mouth	196	65640	23528	11	10
Four Mile Creek (SV-2015) 150' downstream from creek mouth	192	35675	6549	11	10
<i>Pen Branch (SV-2047)</i>	21770	102036	61026	51	51
<i>PB-3 at Road 13.2**</i>	29200	93200	64400	22	NR
<i>Steel Creek (SV-327)</i>	1221	6835	2907	51	51
<i>SC-4 Steel Creek at Road A**</i>	1290	6220	1290	22	NR
Steel Creek (SV-2017) Creek Mouth	320	19294	7687	11	11
Steel Creek Boat Landing (SV-2018)	189	10049	2914	51	49
<i>Steel Creek Boat Ramp</i> <i>River Mile 141.5</i>	115	1910	889	52	NR
<i>Lower Three Runs (SV-2053)</i>	314	960	577	51	51
<i>L3R-1A at Road B**</i>	182	981	618	22	NR
Lower Three Runs (SV-2020) Creek Mouth	347	1065	803	11	11
Little Hell Landing (SV-2019)	196	9908	1513	51	50
<i>Highway 301 Bridge (SV-118)</i>	245	1672	727	51	51
<i>River Mile 118.8**</i>	258	1480	749	52	NR

Notes:

- (1) Invalid samples not included in total
(2) **WSRC data from the SRS Environmental Data Report for 2003
(3) Bold and italicized entries represent colocated sampling stations.
(4) NR: Not Reported
(5) Conc. = Concentration

Summary Statistics Radiological Surface Water Monitoring, 2003

Surface Water Gross Alpha Data

Sample Location	Min. Conc. (pCi/L)	Max. Conc. (pCi/L)	Mean Conc. (pCi/L)	# of Samples	# of Detects
Jackson Landing (SV-2010)	1.210	2.040	1.620	11	2
<i>Upper Three Runs (SV-325)</i>	1.710	6.240	2.720	12	8
<i>U3R-4 at Road A**</i>	0.846	21.600	4.400	22	NR
Beaver Dam Creek (SV-2040)	1.390	1.390	1.390	12	1
<i>Fourmile Branch (SV-2039)</i>	1.220	1.270	1.240	12	2
<i>FM-6 Road A-12.2**</i>	-0.175	1.040	0.377	22	NR
Pen Branch (SV-2047)	2.200	3.310	2.790	12	5
<i>PB-3 at Road 13.2</i>	-0.354	2.050	0.548	22	NR
<i>Steel Creek (SV-327)</i>	1.150	3.490	2.280	12	5
<i>SC-4 Steel Creek at Road A**</i>	-0.276	2.380	0.523	22	NR
Steel Creek Boat Landing (SV-2018)	1.380	1.920	1.650	12	2
<i>Lower Three Runs (SV-2053)</i>	0.920	1.360	1.140	12	2
<i>L3R-1A at Road B**</i>	-0.524	3.680	0.492	22	NR
<i>Highway 301 Bridge (SV-118)</i>	1.590	1.810	1.670	12	3
<i>River Mile 118.8**</i>	-0.800	1.900	0.352	52	NR

Surface Water Gross Beta Data

Sample Location	Min. Conc. (pCi/L)	Max. Conc. (pCi/L)	Mean Conc. (pCi/L)	# of Samples	# of Detects
Jackson Landing (SV-2010)	1.640	3.280	2.330	11	5
<i>Upper Three Runs (SV-325)</i>	1.630	2.420	1.990	12	8
<i>U3R-4 at Road A**</i>	0.668	9.620	2.320	22	NR
Beaver Dam Creek (SV-2040)	1.970	2.950	2.370	12	5
<i>Four Mile Creek (SV-2039)</i>	4.160	9.030	5.760	12	12
<i>FM-6 Road A-12.2**</i>	5.190	9.950	6.780	22	NR
Pen Branch (SV-2047)	1.600	2.620	2.220	12	5
<i>PB-3 at Road 13.2**</i>	-0.217	1.760	0.800	22	NR
<i>Steel Creek (SV-327)</i>	1.960	3.620	2.620	12	4
<i>SC-4 Steel Creek at Road A**</i>	0.174	3.430	1.040	22	NR
Steel Creek Boat Landing (SV-2018)	1.820	2.710	2.270	12	7
<i>Lower Three Runs (SV-2053)</i>	2.060	2.300	2.150	12	3
<i>L3R-1A at Road B**</i>	0.408	8.760	1.840	22	NR
<i>Highway 301 Bridge (SV-118)</i>	2.090	3.990	2.830	12	6
<i>River Mile 118.8**</i>	0.782	4.740	2.280	52	NR

Notes:

(1) Invalid samples not included in total.

(4) NR = Sample results not reported.

(2) **WSRC data from the SRS Environmental Data Report for 2003.

(5) Conc. = Concentration

(3) Bold and italicized entries represent colocated sampling stations for both organizations.

Summary Statistics
Radiological Surface Water Monitoring, 2003

Surface Water Cs-137 Data

Sample Location	Min. Conc. (pCi/L)	Max. Conc. (pCi/L)	Mean Conc. (pCi/L)	# of Samples*	# of Detects
Jackson Landing (SV-2010)	<1.9	<3.82	N/A	11	0
<i>Upper Three Runs (SV-325)</i>	<1.4	<3.94	N/A	12	0
<i>**U3R at Road A</i>	-2.70	4.41	1.060	22	NR
Beaver Dam Creek (SV-2040)	<1.47	<3.62	N/A	12	0
<i>Four Mile Creek (SV-2039)</i>	<1.64	8.22	8.220	12	1
<i>**FM-6 Road A-12.2</i>	-2.07	8.35	3.11	22	NR
<i>Pen Branch (SV-2047)</i>	<1.32	<3.89	N/A	12	0
<i>PB-3 at Road A-13.2</i>	-5.24	5.46	0.0445	22	NR
<i>Steel Creek (SV-327)</i>	<1.41	<3.78	N/A	12	0
<i>**SC-4 Steel Creek at Road A</i>	-4.49	6.46	0.542	22	NR
Steel Creek Boat Landing (SV-2018)	<1.43	<3.78	N/A	12	0
<i>Lower Three Runs (SV-2053)</i>	<1.63	<3.99	N/A	12	0
<i>**L3R-1A at Road B</i>	-3.73	9.8	1.89	22	NR
<i>Highway 301 Bridge (SV-118)</i>	<1.39	<3.74	N/A	12	0
<i>**River Mile 118.8</i>	-1.26	1.90	0.081	52	NR

Notes:

- (1)*Invalid samples not included
- (2)**WSRC data from the SRS Environmental Data Report for 2003
- (3) Bold and italicized entries represent colocated sampling stations for both organizations
- (4) NR = Samples results not reported.
- (5) N/A: Not Applicable

2.4 Non-Radiological Surface Water and Sediment Monitoring

2.4.1 Summary

The streams located on the Savannah River Site (SRS) receive treated wastewater and non-point source runoff from facility operations. Non-radiological surveillance of SRS streams is conducted to monitor for degradation of sediments and surface water quality. Discharges from SRS are regulated by the Site's National Pollutant Discharge Elimination System (NPDES) permits.

The SRS non-radiological sediment program consists of the collection of sediment samples at eight stream locations and three Savannah River locations. The sediment samples are collected on an annual basis. Collection is made by either a Ponar sediment sampler or an Emery pipe dredge sampler. The samples are analyzed by Toxicity Characteristic Leaching Procedure (TCLP) for inorganic constituents (e.g., metals) and pesticides/herbicides. SRS sediment sampling locations are listed in Table 1, section 2.4.3.

The Environmental Monitoring Section of Westinghouse Environmental Protection Division collects water samples from five locations along the Savannah River and eleven locations on the SRS. This sampling format remains relatively consistent from year to year with occasional modifications. Grab samples are collected monthly and analyzed for the following water quality parameters: metals, pesticides, herbicides, and other inorganic properties. Measurements of conductivity, dissolved oxygen, pH, and temperature are taken in the field. SRS streams are classified as Freshwaters in accordance with South Carolina Department of Health and Environmental Control (SCDHEC) Water Classifications and Standards. Freshwaters are characterized by: (1) a dissolved oxygen level with a daily average no less than 5.0 milligrams per liter (mg/L); (2) fecal coliform, not to exceed a geometric mean of 200 colonies/100 milliliter (ml) based on five consecutive samples during any 30 day period; nor shall more than 10 percent of the total samples during any 30 day period exceed 400 colonies/100 ml; (3) a pH between 6.0 and 8.5; and (4) the temperature to be increased no more than five degrees Fahrenheit above natural conditions. SRS surface water sample locations are listed in Table 2, Section 2.4.3. SCDHEC ESOP non-radiological surface water and sediment sampling locations are listed in Table 3, section 2.4.3.

RESULTS AND DISCUSSION

Sediments

Metals were detected in many of the sediment samples. Cadmium was detected above the state average of 1.24 mg/kg at SV-2027, SV-326 and SV-175. Nickel was detected above the state average of 3.92 mg/kg at SV-324, SV, 326 and SV-175. Zinc was also detected above the state average of 21.61 mg/kg at SV-326 and SV-175. The detected metals can be traced to on-site facilities, effluents & processes.

For the first time, acetone was detected in sediment samples collected at SV-326 & SV-324. Acetone was not detected in the duplicate sample, which was collected at SV-324. Information

regarding acetone contamination on SRS was not available. Further investigation into the matter may be warranted. However, acetone is used in sediment sample analysis, therefore, the detected acetone may be due to lab contamination.

Note that South Carolina state averages are from the Summary of Selected Water Quality Parameter Concentrations in South Carolina Water and Sediments. All ESOP sediment data can be found in Section 2.4.4.

Surface Water

ESOP field personnel recorded pH at each sample location during each sampling event. The Freshwaters pH standard for South Carolina is between 6.0 and 8.5. Measurements below the standard range for pH were repeatedly observed in 2003 at Upper Three Runs (SV-2027) sample location, which is the background location not typically affected by site operations. These measurements ranged from 4.32 to 5.74. Low pH is typical for blackwater streams such as Upper Three Runs. During October and November sampling events, pH was not recorded because of equipment failure. All surface water data can be found in Section 2.4.4.

Nitrate/nitrite concentrations above the state average of 0.639 mg/L were observed from monthly samples collected at Four Mile Creek (SV-326) location (Figure 1, Section 2.4.3). The average nitrate concentration at the Four Mile Creek location (SV-326) was 0.75 mg/L, which decreased from the 2002 average of 1.69 mg/L. The elevated nitrate level may be explained by groundwater beneath F-Area and H-Area seepage basins outcropping into Four Mile Creek however, the observed levels of nitrate are still below the 10 mg/L MCL. In fall of 2003, samples were collected from additional locations upstream from SV-326. The results were inconclusive and further sampling may take place. If nitrate levels continue to decrease, more sampling will not be required.

The SRS surface water sample location FM-6 on Four Mile Creek is located approximately four miles downstream from the ESOP surface water sample location (SV-326). The SRS average concentration for this location in 2003 was 0.575 mg/L. As shown in Figure 1, SRS nitrate levels for Four Mile Creek have been consistently below ESOP nitrate levels.

ESOP field personnel collected surface water samples for fecal coliform analysis at each location during each sampling event. The freshwaters fecal coliform standard for South Carolina is: five consecutive samples during any 30 day period shall not exceed a geometric mean of 200 colonies/100 ml membrane fecal coliform (MFC); nor shall more than 10 percent of the total samples during any 30 day period exceed 400 colonies/100ml MFC. Three of 96 fecal coliform samples (3.1 percent) in 2003 were greater than 400 colonies/100ml MFC.

Samples analyzed for other parameters (including but not limited to conductivity, alkalinity, metals, total organic carbon, volatile organic compounds, pesticides and polychlorinated biphenyl) indicated no deviations from established freshwater conditions during this study. All surface water data are located in Section 2.4.4.

ESOP and SRS data comparison for the four colocated sample locations for 2003 are found in Section 2.4.4. The data comparison includes yearly averages, yearly observed maximums and minimums. There were no notable differences between ESOP and SRS surface water data.

Note that South Carolina state averages are from the Summary of Selected Water Quality Parameter Concentrations in South Carolina Water and Sediments.

CONCLUSIONS / RECOMMENDATIONS

An accurate comparison of SRS and ESOP sediment data could not be completed because of different methods used in analyzing sediments.

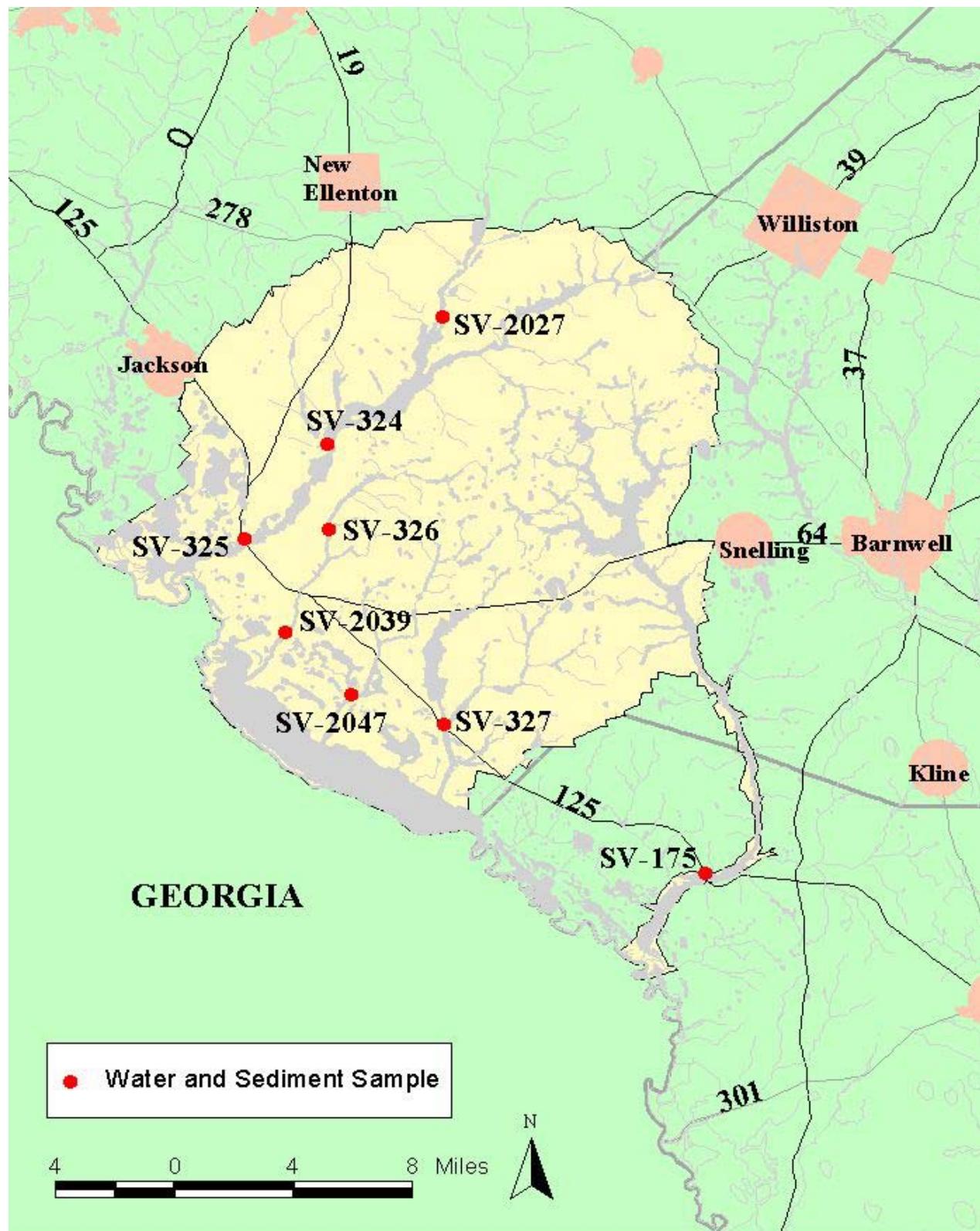
Measurements of pH, ranging from 5.02 to 6.26, were observed at Upper Three Runs (SV-2027) sample location, a background location not typically affected by site operations. SRS reported that the pH indicated normal trends for a southern pine forest stream. Also, nitrate concentrations from Four Mile Creek (SV-326) were higher than the average nitrate levels measured at the other seven locations. The higher nitrate levels observed at Four Mile Creek (SV-326) are a possible result of discharge from the waste treatment facility. This facility is upstream from the sample site. The maximum nitrate concentration observed at sample site SV-326 during 2003 was 1.9 mg/L with a mean concentration of 0.75 mg/L for all 2003 samples collected at this sample site. However, all sample results were below the United States Environmental Protection Agency National Primary Drinking Water Standard Maximum Contaminant Level of 10 mg/L for nitrate/nitrite concentrations). Overall, the non-radiological water quality on the SRS compares favorably with the South Carolina Freshwaters standard for the parameters and locations monitored in this study.

South Carolina state averages are from the Summary of Selected Water Quality Parameter Concentrations in South Carolina Water and Sediments. The state averages will continue to be used as comparison data until the ESOP background sampling program is completed.

ESOP will continue the non-radiological independent monitoring and surveillance of SRS surface water to verify and validate SRS surface water quality. Continued monitoring is required because of increased land disturbance from accelerated clean-up, logging, and the potential for new emissions. The future locations, numbers of samples, sample frequencies and monitoring parameters may change to maximize available resources and address critical issues.

2.4.2

Map 5. Non-radiological Surface Water and Sediment Sampling Locations



2.4.3 Tables and Figures

Non-radiological Surface Water and Sediment Sampling, 2003

Figure 1. SRS (WSRC) and ESOP Nitrate Levels in Four Mile Creek.

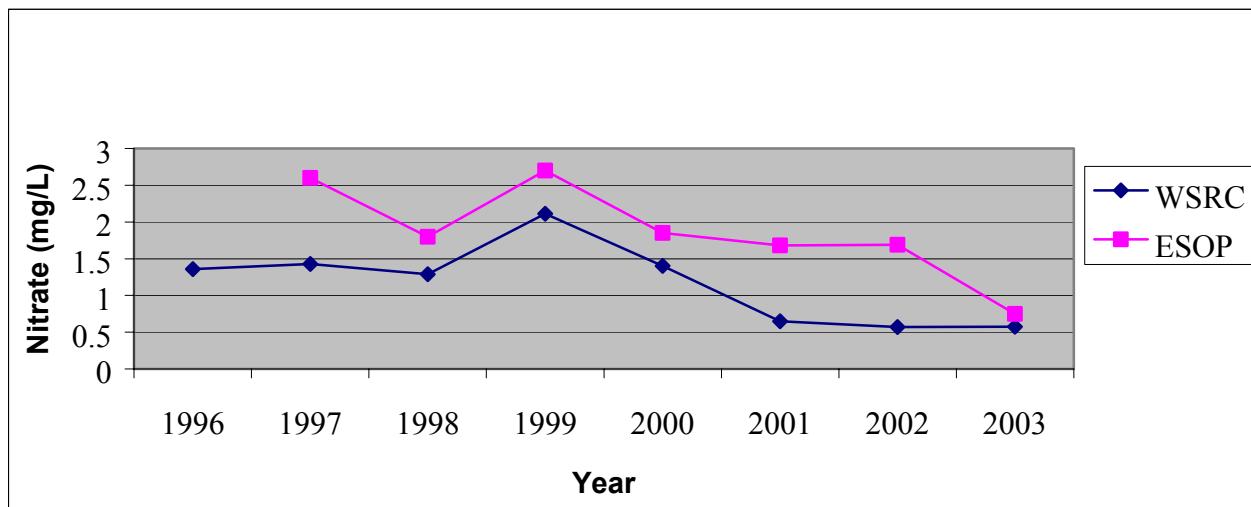


Table 1. SRS Non-radiological Sediment Sample Locations.

SRS Stream Locations	Savannah River Locations
Tinker Creek near Northeast Site Boundary	River Mile 160
Upper Three Runs at Road 1-A	River Mile 150.2
Upper Three Runs at Road A	River Mile 118.8
Beaver Dam Creek at D-Area	
Four Mile Creek at Road A	
Pen Branch at Road A	
Steel Creek at Road A	
Lower Three Runs at Patterson Mill Rd.	

Non-radiological Surface Water and Sediment Sampling, 2003**Table 2. SRS Non-radiological Surface Water Sample Locations.**

SRS Stream Locations	Savannah River Locations
Tinker Creek near Northeast Site Boundary	River Mile 160
Tim's Branch at Road C	River Mile 150.4
*Upper Three Runs at Road 1-A	River Mile 141.5
*Upper Three Runs at Road A	River Mile 129.1
Beaver Dam Creek at D-Area	River Mile 118.8
Four Mile Creek at Road E	
Four Mile Creek at Road C	
Four Mile Creek adjacent to D-Area	
*Pen Branch at Road A-13.2	
*Steel Creek at Road A	
Lower Three Runs at Patterson Mill Rd.	

Table 3. ESOP Non-radiological Sediment and Surface Water Sample Locations.

Sample Location	Location Description	Location Rationale
SV-2027	Upper Three Runs at Road 2-1	Background Sample
SV-324	Tims Branch at Road C	Downstream from M- & A-Areas
SV-326	Four Mile Creek at Road A-7	Downstream from F- & H-Areas
SV-325	Upper Three Runs at Road A	Downstream from F-Area
SV-2047	Pen Branch at Road A	Downstream from K-Area
SV-327	Steel Creek at Road A	Downstream from L-Lake
SV-175	Lower Three Runs at Highway 125	Downstream from Par Pond

2.4.4 Data**Non-radiological Surface Water and Sediment Monitoring Data, 2003**

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Notes:

1. NS= No Sample
2. (e) = Estimate.
3. LE = Lab Error
4. AP = Analytical Problem.
5. NA = Not Analyzed
6. ND = Non Detect
7. NH₃ NH₄ = Ammonia
8. NO₃ NO₂ = Nitrate-Nitrite

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location SV-2027 (Upper Three Runs)								
Sample Date:		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Monthly Parameters	pH	su	5.6	5.25	6.26	NS	AP	5.16
	DO	mg/L	NS	7.42	7.9	8.1	7.73	6.79
	Water Temperature	celsius	11.7	13.7	16	18.9	17.7	21.9
	Conductivity	mS/cm	0.052	0.042	0.019	0.02	0.058	0.061
	Alkalinity	mg/L	15	<1.0	<1.0	1.5	<1.0	<1.0
	Turbidity	NTU	1.4	1.4	1.2	1.6	4.7	2.4
	BOD 5	mg/L	<2.0	2.5	<2.0	<2.0	5.1	LE
	TSS	mg/L	LE	1.2	3.2	5.7	5.4	6.8
	Fecal Coliform (MFC)	FC/100mL	300	120	90(e)	65(e)	220	100
	NH3 NH4	mg/L	<0.050	0.13	0.12	0.23	0.063	0.072
	NO3 NO2	mg/L	0.28	0.24	0.21	0.15	0.15	0.17
	TKN	mg/L	<0.10	0.18	0.28	0.33	0.58	0.32
Quarterly Metals and TOC	Total Phosphorus	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	0.02	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.18	NS	NS	0.35	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	<2.0	NS	NS	3.2	NS	NS
	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's	mg/L	NS	NS	NS	NS	ND	
		mg/L						
Sample Location: SV-2027 (Upper Three Runs)								

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-2027 (Upper Three Runs)								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su	5.93	5.28	5.47	5.65	5.31	5.02
	DO	mg/L	8.79	7.86	7.40	6.09	NS	9.10
	Water Temperature	celsius	21.2	21.3	20.3	18.3	15.5	11.1
	Conductivity	mS/cm	0.044	0.052	0.041	0.087	0.030	0.075
	Alkalinity	mg/L	<1.0	<1.0	1.1	<1.0	1	<1.0
	Turbidity	NTU	2.4	1.4	<1.0	1.6	1.2	1.1
	BOD	mg/L	3.6	4.2	4.7	4.6	6.6	6.0
	TSS	mg/L	5.2	5.0	4.5	4.70	2.8	2.8
	Fecal Coliform (MFC)	FC/100mL	75(e)	100	100	85(e)	90(e)	35(e)
	NH3 NH4	mg/L	0.12	0.120	<0.050	<0.050	<0.050	<0.050
	NO3 NO2	mg/L	0.18	0.064	0.22	0.22	0.20	0.280
	TKN	mg/L	0.29	0.77	0.59	0.27	0.65	0.42
	Total Phosphorus	mg/L	<0.020	0.026	<0.020	<0.020	<0.020	<0.020
Quarterly Metals and TOC	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.45	NS	NS	0.20	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
	TOC	mg/L	3.8	NS	NS	<2.0	NS	NS
Quarterly VOC's	VOC's	mg/L	ND	NS	NS	ND	NS	NS
		mg/L						
		mg/L						
Annual Pesticides and PCB's	Pesticides	ug/L	NS	NS	NS	NS	NS	NS
	PCB's	ug/L	NS	NS	NS	NS	NS	NS
		ug/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-324 (Tim's Branch)								
Sample Date:		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Monthly Parameters	pH	su	6.06	5.57	5.54	NS	5.28	6.83
	DO	mg/L	NS	8.52	7.94	7.91	7.63	6.89
	Water Temperature	celsius	10.4	12.3	16.1	18.2	17.8	23.2
	Conductivity	mS/cm	0.025	0.034	0.108	0.024	0.036	0.026
	Alkalinity	mg/L	11	3.2	3	4.7	3.3	5.5
	Turbidity	NTU	1.4	2.4	2.2	4.8	10	5.5
	BOD	mg/L	2.8	<2.0	5.5	<2.0	<2.0	<2.0
	TSS	mg/L	LE	1.5	2.8	5.9	6.7	18
	Fecal Coliform (MFC)	FC/100mL	8(e)	20(e)	25(e)	8 (e)	50(e)	55 (e)
	NH3 NH4	mg/L	0.054	0.15	0.14	0.087	0.099	<0.050
	NO3 NO2	mg/L	2.5	0.15	0.11	0.076	0.069	0.054
	TKN	mg/L	0.18	0.28	0.2	0.40	0.69	0.47
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.2	<0.020	<0.020	0.042	0.052	0.028
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.61	NS	NS	2.0	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.063	NS	NS	0.064	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	2.2	NS	NS	6.2	NS	NS
	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's	mg/L	NS	NS	NS	NS	ND	NS
		mg/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-324 (Tim's Branch)								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su	6.89	6.90	6.74	6.84	6.51	5.88
	DO	mg/L	6.44	8.44	7.34	7.84	NS	10.01
	Water Temperature	celsius	21.9	22.4	20.9	17.7	14.7	8.2
	Conductivity	mS/cm	0.022	0.024	0.022	0.020	0.028	0.026
	Alkalinity	mg/L	5.0	6.0	5.4	3.7	8.8	4.2
	Turbidity	NTU	4.4	6.0	3.4	3.5	3.2	2.2
	BOD	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	4.2
	TSS	mg/L	7.4	7.3	6.4	5.30	4.0	2.0
	Fecal Coliform (MFC)	FC/100mL	40(e)	200	280	290	260	40(e)
	NH3 NH4	mg/L	0.15	0.08	0.074	0.053	<0.050	<0.050
	NO3 NO2	mg/L	0.07	0.05	0.061	0.067	0.037	0.11
	TKN	mg/L	0.34	0.59	0.45	0.34	1.1	0.44
	Total Phosphorus	mg/L	0.033	0.034	0.037	0.023	0.023	<0.020
Quarterly Metals and TOC	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	2.3	NS	NS	1.3	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.12	NS	NS	0.052	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	0.12	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
	TOC	mg/L	6.2	NS	NS	3.0	NS	NS
Quarterly VOC's		mg/L	ND		NS	ND	NS	NS
		mg/L						
		mg/L						
Annual Pesticides and PCB's	Pesticides	ug/L	NS		NS	NS	NS	NS
	PCB's	ug/L	NS		NS	NS	NS	NS
		ug/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-326 (Four Mile Creek)								
Sample Date:		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Monthly Parameters	pH	su	6.63	6.05	6.32	NS	6.11	7.37
	DO	mg/L	NS	9.4	8.57	7.83	7.52	5.21
	Water Temperature	celsius	8.5	11.8	16.1	20.1	19.5	24.9
	Conductivity	mS/cm	0.083	0.066	0.078	0.048	0.074	0.046
	Alkalinity	mg/L	2.6	13	16	11	13	12
	Turbidity	NTU	2.9	4	2.9	3.6	6.2	3.6
	BOD	mg/L	<2.0	<2.0	<2.0	2	5.0	<2.0
	TSS	mg/L	LE	2.5	5	41	5.8	5.2
	Fecal Coliform (MFC)	FC/100mL	24(e)	25(e)	35(e)	170	75(e)	120
	NH3 NH4	mg/L	0.089	0.17	0.073	0.1	<0.050	0.054
	NO3 NO2	mg/L	0.15	1.2	1.4	0.5	0.56	0.22
	TKN	mg/L	0.14	0.4	0.32	0.36	0.61	0.47
Quarterly Metals and TOC	Total Phosphorus	mg/L	<0.020	0.072	0.2	0.12	0.099	0.068
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.57	NS	NS	1.1	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.1	NS	NS	0.11	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	0.037	NS	NS	0.018	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	<2.0	NS	NS	5.7	NS	NS
	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's	mg/L	NS	NS	NS	NS	ND	NS
		mg/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-326 (Four Mile Creek)								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su	6.01	7.57	7.21	7.24	7.07	6.86
	DO	mg/L	7.75	7.65	6.12	6.51	NS	10.10
	Water Temperature	celsius	24.1	24.2	22.1	17.9	15.2	7.7
	Conductivity	mS/cm	0.109	0.054	0.049	0.058	0.055	0.086
	Alkalinity	mg/L	16	22	12	14	16	15
	Turbidity	NTU	5.5	7.5	2.9	2.3	3.2	3.3
	BOD	mg/L	4.6	<2.0	<2.0	<2.0	<2.0	<2.0
	TSS	mg/L	7.3	5.4	4.5	3.30	4.3	2.0
	Fecal Coliform (MFC)	FC/100mL	80(e)	55(e)	60(e)	100	78(e)	25(e)
	NH3 NH4	mg/L	0.14	0.05	0.06	<0.050	<0.050	<0.050
	NO3 NO2	mg/L	0.60	0.17	0.74	0.74	0.59	1.9
	TKN	mg/L	0.44	0.68	0.37	0.31	0.92	0.50
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.16	0.065	0.14	0.19	0.13	0.11
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	2.00	NS	NS	0.89	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.12	NS	NS	0.023	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	6.2	NS	NS	4.3	NS	NS
	VOC's	mg/L	ND	NS	NS	ND	NS	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	ug/L	NS	NS	NS	NS	NS	NS
	PCB's	ug/L	NS	NS	NS	NS	NS	NS
		ug/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-325 (Upper Three Runs)								
Sample Date:		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Monthly Parameters	pH	su	6.12	5.36	6.61	5.8	4.65	5.27
	DO	mg/L	NS	8.46	8.08	6.87	6.75	5.25
	Water Temperature	celsius	7.6	12.4	17.1	16.9	19.3	23.6
	Conductivity	mS/cm	0.022	0.026	0.021	0.054	0.037	0.023
	Alkalinity	mg/L	15	1.6	2.4	2.8	<1.0	1.2
	Turbidity	NTU	1.1	4.1	2	2.7	10	4.3
	BOD	mg/L	<2.0	<2.0	<2.0	4.4	6.8	5
	TSS	mg/L	LE	3	5	6.6	6.6	8.1
	Fecal Coliform (MFC)	FC/100mL	50	150	35(e)	70	750(e)	180
	NH3 NH4	mg/L	0.06	0.26	0.096	0.061	0.073	0.062
	NO3 NO2	mg/L	0.16	0.092	0.11	0.094	0.053	0.054
	TKN	mg/L	0.13	0.43	0.22	0.27	0.77	0.57
	Total Phosphorus	mg/L	<0.020	0.024	<0.020	0.036	0.028	<0.020
Quarterly Metals and TOC	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	0.02	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.23	NS	NS	0.55	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.021	NS	NS	0.021	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	0.017	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	0.00021	NS	NS
	TOC	mg/L	<2.0	NS	NS	6.2	NS	NS
Quarterly VOC's	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
		mg/L						
Annual Pesticides and PCB's	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's	mg/L	NS	NS	NS	NS	ND	NS

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-325 (Upper Three Runs)								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su	6.22	7.33	6.42	7.31	7.47	6.84
	DO	mg/L	7.82	6.12	8.86	8.61	NS	10.17
	Water Temperature	celsius	23.0	22.8	23.3	19.2	16.2	8.9
	Conductivity	mS/cm	0.024	0.018	0.171	0.018	0.018	0.020
	Alkalinity	mg/L	3.5	3.4	2.8	3.6	1.3	3.3
	Turbidity	NTU	4.6	2.3	1.7	1.5	1.7	1.4
	BOD	mg/L	<2.0	<2.0	6.5	<2.0	<2.0	<2.0
	TSS	mg/L	10.0	8.6	11.0	4.9	4.8	3.8
	Fecal Coliform (MFC)	FC/100mL	160	70(e)	180	100	85(e)	40(e)
	NH3 NH4	mg/L	0.093	0.11	0.080	<0.050	<0.050	<0.050
	NO3 NO2	mg/L	0.11	0.11	0.14	0.14	0.20	0.15
	TKN	mg/L	0.43	0.58	0.47	0.31	0.65	0.39
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.028	0.024	0.030	<0.020	<0.020	<0.020
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.78	NS	NS	0.32	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.022	NS	NS	<0.010	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	5.2	NS	NS	2.0	NS	NS
	VOC's	mg/L	ND	NS	NS	ND	NS	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	ug/L	NS	NS	NS	NS	NS	NS
	PCB's	ug/L	NS	NS	NS	NS	NS	NS
		ug/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-2047 (Pen Branch)								
Sample Date:		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Monthly Parameters	pH	su	6.41	5.51	6.36	6.79	6.02	7.1
	DO	mg/L	NS	8.02	8.7	7.58	8.74	6.09
	Water Temperature	celsius	8.1	14.2	17.2	17.8	21.3	24.6
	Conductivity	mS/cm	0.049	0.129	0.068	0.053	0.045	0.041
	Alkalinity	mg/L	46	13	14	15	11	12
	Turbidity	NTU	1.8	3.2	3.2	5	7.0	5
	BOD	mg/L	<2.0	7.2	<2.0	<2.0	7.0	<2.0
	TSS	mg/L	LE	3.5	3.8	6.8	10	LE
	Fecal Coliform (MFC)	FC/100mL	120	5(e)	25(e)	95	70(e)	100
	NH3 NH4	mg/L	<0.050	0.23	0.11	0.1	0.12	<0.050
	NO3 NO2	mg/L	0.072	0.41	0.2	0.068	0.069	0.059
	TKN	mg/L	0.29	0.49	0.37	0.46	0.66	0.84
	Total Phosphorus	mg/L	0.021	<0.020	<0.020	0.023	<0.020	<0.020
Quarterly Metals and TOC	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	0.015	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.45	NS	NS	1.0	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.046	NS	NS	0.12	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	0.012	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
	TOC	mg/L	5.2	NS	NS	11	NS	NS
Quarterly VOC's	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
		mg/L						
Annual Pesticides and PCB's	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's	mg/L	NS	NS	NS	NS	ND	NS

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-2047 (Pen Branch)								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su	7.15	7.32	7.35	7.98	6.55	6.64
	DO	mg/L	7.76	7.92	8.74	8.12	NS	10.06
	Water Temperature	celsius	23.9	24.2	22.5	18.6	17.8	8.9
	Conductivity	mS/cm	0.049	0.046	0.050	0.051	0.068	0.101
	Alkalinity	mg/L	15	14	16	16	16	16
	Turbidity	NTU	3.0	4.4	2.8	1.8	2.2	2.5
	BOD	mg/L	<2.0	<2.0	2.9	<2.0	4.0	5.8
	TSS	mg/L	8.2	11.0	5.8	3.1	2.0	1.6
	Fecal Coliform (MFC)	FC/100mL	40(e)	30(e)	120	NS	120	100
	NH3 NH4	mg/L	0.095	0.066	<0.050	0.062	<0.050	<0.050
	NO3 NO2	mg/L	0.078	0.18	0.099	0.11	0.093	0.16
	TKN	mg/L	0.46	0.40	0.38	0.32	0.74	0.37
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.025	<0.020	<0.020	0.022	0.040	<0.020
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	1.7	NS	NS	0.47	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.18	NS	NS	0.018	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	0.11	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	9.0	NS	NS	4.1	NS	NS
	VOC's	mg/L	ND	NS	NS	ND	NS	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	ug/L	NS	NS	NS	NS	NS	NS
	PCB's	ug/L	NS	NS	NS	NS	NS	NS
		ug/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-327 (Steel Creek)								
Sample Date:		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Monthly Parameters	pH	su	6.13	6.01	6.68	6.86	6.49	7.48
	DO	mg/L	NS	7.99	8.76	8	8.39	7.96
	Water Temperature	celsius	8.3	14	17	18.1	23.2	25.3
	Conductivity	mS/cm	0.098	0.069	0.057	0.064	0.043	0.053
	Alkalinity	mg/L	19	15	17	15	13	12
	Turbidity	NTU	1.4	1.5	1.6	1.5	1.8	1.8
	BOD	mg/L	5.9	<2.0	<2.0	3.5	5.9	<2.0
	TSS	mg/L	LE	2.0	3.1	3.8	6.0	5.4
	Fecal Coliform (MFC)	FC/100mL	AP	40(e)	45(e)	46	50(e)	40(e)
	NH3 NH4	mg/L	0.063	0.21	0.056	0.20	0.067	<0.050
	NO3 NO2	mg/L	0.038	0.13	0.13	0.026	0.028	0.047
	TKN	mg/L	0.38	0.38	0.33	0.43	0.64	0.41
	Total Phosphorus	mg/L	0.037	<0.020	<0.020	<0.020	<0.020	<0.020
Quarterly Metals and TOC	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	0.015	NS	NS	<0.010	NS	NS
	Iron	mg/L	1.7	NS	NS	0.53	NS	NS
	Lead	mg/L	<0.00020	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.26	NS	NS	0.069	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	0.028	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
	TOC	mg/L	<0.050	NS	NS	6.1	NS	NS
Quarterly VOC's	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
		mg/L						
Annual Pesticides and PCB's	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's	mg/L	NS	NS	NS	NS	ND	NS

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-327 (Steel Creek)								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su	7.37	7.31	7.88	7.39	7.07	7.06
	DO	mg/L	6.34	6.01	7.55	9.35	NS	10.04
	Water Temperature	celsius	23.7	25.6	22.4	19.3	17.6	9.3
	Conductivity	mS/cm	0.050	0.084	0.050	0.055	0.052	0.054
	Alkalinity	mg/L	16	14	20	21	21	20
	Turbidity	NTU	3.4	3.1	1.6	1.5	2.6	1.6
	BOD	mg/L	<2.0	2.3	<2.0	<2.0	<2.0	<2.0
	TSS	mg/L	6.8	32	3.4	3.8	19	<0.50
	Fecal Coliform (MFC)	FC/100mL	60(e)	60(e)	55(e)	160	90(e)	5(e)
	NH3 NH4	mg/L	0.077	0.074	0.060	0.051	<0.050	<0.050
	NO3 NO2	mg/L	0.076	0.055	0.086	0.071	0.035	0.086
	TKN	mg/L	0.50	1.20	0.36	0.40	0.85	0.47
	Total Phosphorus	mg/L	<0.020	0.040	<0.020	<0.020	<0.020	<0.020
Quarterly Metals and TOC	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	1.4	NS	NS	0.40	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.22	NS	NS	0.029	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	0.024	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
	TOC	mg/L	8.8	NS	NS	3.8	NS	NS
Quarterly VOC's	VOC's	mg/L	ND	NS	NS	ND	NS	NS
		mg/L						
		mg/L						
Annual Pesticides and PCB's	Pesticides	ug/L	NS	NS	NS	NS	NS	NS
	PCB's	ug/L	NS	NS	NS	NS	NS	NS
		ug/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-175 (Lower Three Runs)								
Sample Date:		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Monthly Parameters	pH	su	6.21	6.29	NS	6.72	6.55	7.68
	DO	mg/L	NS	7.93	NS	8.37	8.04	6.99
	Water Temperature	celsius	8.4	13.2	NS	17	20.2	24.8
	Conductivity	mS/cm	0.46	0.073	NS	0.022	0.061	0.051
	Alkalinity	mg/L	59	28	NS	29	24	22
	Turbidity	NTU	1.8	3.2	NS	2.7	4.8	3.3
	BOD	mg/L	<2.0	<2.0	NS	<2.0	78.0	<2.0
	TSS	mg/L	LE	3	NS	3.4	11	56
	Fecal Coliform (MFC)	FC/100mL	90	300	NS	92	550	340
	NH3 NH4	mg/L	<0.050	0.11	NS	0.22	0.079	0.076
	NO3 NO2	mg/L	0.068	0.044	NS	0.047	0.10	0.066
	TKN	mg/L	0.31	0.52	NS	0.45	0.93	0.2
Quarterly Metals and TOC	Total Phosphorus	mg/L	5.2	0.022	NS	0.031	0.034	<0.020
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	0.014	NS	NS	<0.010	NS	NS
	Iron	mg/L	0.39	NS	NS	0.80	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.035	NS	NS	0.062	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	5.2	NS	NS	12	NS	NS
	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's	mg/L	NS	NS	NS	NS	ND	NS
		mg/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: SV-175 (Lower Three Runs)								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su	6.86	6.78	7.35	7.27	6.81	7.64
	DO	mg/L	6.78	8.13	7.39	8.23	NS	10.52
	Water Temperature	celsius	24.0	25.7	22.9	18.9	17.7	8.4
	Conductivity	mS/cm	0.096	0.084	0.073	0.143	0.031	0.075
	Alkalinity	mg/L	27	24	32	40	35	35
	Turbidity	NTU	3.8	3.3	1.9	1.6	1.7	1.6
	BOD	mg/L	LE	5.3	5.4	5.9	<2.0	<2.0
	TSS	mg/L	9.3	7.4	4.6	4.6	10	0.6
	Fecal Coliform (MFC)	FC/100mL	310	130(e)	100	220	150	120
	NH3 NH4	mg/L	0.068	0.13	0.057	0.15	<0.050	<0.050
	NO3 NO2	mg/L	0.066	0.061	0.10	0.095	0.03	0.073
	TKN	mg/L	0.56	0.80	0.43	0.34	0.80	0.40
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.037	0.044	0.022	0.022	<0.020	<0.020
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	1.0	NS	NS	0.39	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.12	NS	NS	0.059	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	11	NS	NS	5.9	NS	NS
	VOC's	mg/L	ND	NS	NS	ND	NS	NS
		mg/L						
Annual Pesticides and PCB's	Pesticides	ug/L	NS	NS	NS	NS	NS	NS
	PCB's	ug/L	NS	NS	NS	NS	NS	NS
		ug/L						

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: Blind Duplicate		units	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03
Sample Date:								
Monthly Parameters	pH	su						
	DO	mg/L						
	Water Temperature	celsius						
	Conductivity	mS/cm						
	Alkalinity	mg/L	31	<1.0	1	15	1.0	22
	Turbidity	NTU	1.4	1.5	1.1	5.1	10	2.8
	BOD	mg/L	<2.0	<2.0	<2.0	<2.0	2.2	<2.0
	TSS	mg/L	LE	2.0	3.4	6.4	5.6	13
	Fecal Coliform (MFC)	FC/100mL	AP	100	90(e)	84	1200(e)	160
	NH3 NH4	mg/L	<0.050	0.16	0.094	0.16	<0.050	<0.050
	NO3 NO2	mg/L	<0.020	0.23	0.21	0.070	0.054	0.060
	TKN	mg/L	0.92	0.22	<0.10	0.51	0.69	0.65
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.24	<0.020	<0.020	11	0.029	0.031
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	0.016	NS	NS	<0.010	NS	NS
	Iron	mg/L	6.3	NS	NS	1.1	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.6	NS	NS	0.13	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	0.071	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	9.9	NS	NS	11	NS	NS
	VOC's	mg/L	ND	NS	NS	NS	ND	NS
		mg/L						
Annual Pesticides and PCB's		mg/L						
	Pesticides	mg/L	NS	NS	NS	NS	ND	NS
	PCB's		NS	NS	NS	NS	ND	NS

Non-radiological Surface Water Monitoring, 2003
Non-radiological Surface Water Data

Sample Location: Blind Duplicate								
Sample Date:		units	Jul-03	Aug-03	Sep-03	Oct-03	Nov-03	Dec-03
Monthly Parameters	pH	su						
	DO	mg/L						
	Water Temperature	celsius						
	Conductivity	mS/cm						
	Alkalinity	mg/L	16	14	1.0	3.2	36	3.2
	Turbidity	NTU	3.1	3.1	1.0	2.8	2.0	1.3
	BOD	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
	TSS	mg/L	13.0	12	3.8	11	19	4.0
	Fecal Coliform (MFC)	FC/100mL	5 (e)	75(e)	110	140	130	45(e)
	NH3 NH4	mg/L	0.23	0.14	0.078	<0.050	<0.050	<0.050
	NO3 NO2	mg/L	0.071	0.058	0.22	0.14	0.024	0.14
	TKN	mg/L	0.44	1.00	0.28	0.28	1.0	0.26
Quarterly Metals and TOC	Total Phosphorus	mg/L	<0.020	0.032	<0.020	<0.020	0.033	<0.020
	Cadmium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Chromium	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Copper	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Iron	mg/L	1.0	NS	NS	0.34	NS	NS
	Lead	mg/L	<0.050	NS	NS	<0.050	NS	NS
	Manganese	mg/L	0.12	NS	NS	<0.010	NS	NS
	Nickel	mg/L	<0.020	NS	NS	<0.020	NS	NS
	Zinc	mg/L	<0.010	NS	NS	<0.010	NS	NS
	Mercury	mg/L	<0.00020	NS	NS	<0.00020	NS	NS
Quarterly VOC's	TOC	mg/L	9.6	NS	NS	2.1	NS	NS
	VOC's	mg/L	ND	NS	NS	ND	NS	NS
		mg/L						
Annual Pesticides and PCB's		mg/L						
	Pesticides	ug/L	NS	NS	NS	NS	NS	NS
	PCBs	ug/L	NS	NS	NS	NS	NS	NS

Non-radiological Surface Water Monitoring, 2003
Non-radiological Sediment Data

Sample Location:		SV-2027	SV-324	SV-326	SV-325	
Sample Date:		5/28/03	5/28/03	5/28/03	5/28/03	
Metals and TOC	TKN	mg/kg	700	680	760	1200
	Total Phosphorus	mg/kg	190	340	40	240
	Percent Volatile Solids	%	13	3	4	4
	Cadmium	mg/kg	1.7	<1.0	1.6	<1.0
	Chromium	mg/kg	7.0	4.2	4.8	2.6
	Copper	mg/kg	3.7	<1.0	4.2	<1.0
	Lead	mg/kg	6.0	5.1	<5.0	<5.0
VOC's	Nickel	mg/kg	3.2	10	4.4	<2.0
	Zinc	mg/kg	10	4.1	50	4.5
	Mercury	mg/kg	<0.25	<0.25	<0.25	<0.25
	1,1,1-Trichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1,2,2-Tetrachloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1,2-Trichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1-Dichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1-Dichloroethene	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,2-Dichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,2-Dichloropropane	mg/kg	<0.020	<0.020	<0.020	<0.020
	2-Butanone	mg/kg	<0.020	<0.020	<0.020	<0.020
	2-Hexanone	mg/kg	<0.020	<0.020	<0.020	<0.020
	4-Methyl-2-Pentanone	mg/kg	<0.020	<0.020	<0.020	<0.020
	Acetone	mg/kg	<0.050	196	0.327	<0.050
	Benzene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Bromodichloromethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	Bromoform	mg/kg	<0.020	<0.020	<0.020	<0.020
	Bromomethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	Carbon Disulfide	mg/kg	<0.020	<0.020	<0.020	<0.020
	Carbon tetrachloride	mg/kg	<0.020	<0.020	<0.020	<0.020
	cis-1,2Dichloroethylene	mg/kg	<0.020	<0.020	<0.020	<0.020
	cis-1,3-Dichloropropene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Dibromochloromethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	Ethyl benzene	mg/kg	<0.020	<0.020	<0.020	<0.020
	m,p-xylenes	mg/kg	<0.040	<0.040	<0.040	<0.040
	o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Styrene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Tetrachloroethene	mg/kg	<0.020	<0.020	<0.020	<0.020

Non-radiological Surface Water Monitoring, 2003
Non-radiological Sediment Data

Sample Location:		SV-2027	SV-324	SV-326	SV-325
Sample Date:		5/28/03	5/28/03	5/28/03	5/28/03
VOCs Continued	Toluene	mg/kg	<0.020	<0.020	<0.020
	trans-1,2-Dichloroethene	mg/kg	<0.020	<0.020	<0.020
	trans-1,3-Dichloropropene	mg/kg	<0.020	<0.020	<0.020
	Trichlorethene	mg/kg	<0.020	<0.020	<0.020
	Vinyl chloride	mg/kg	<0.020	<0.020	<0.020
Pesticides/PCB	Aldrin	mg/kg	<0.0020	<0.0020	<0.0020
	alpha-BHC	mg/kg	<0.0020	<0.0020	<0.0020
	beta-BHC	mg/kg	<0.0020	<0.0020	<0.0020
	Chlordane	mg/kg	<0.015	<0.015	<0.015
	delta-BHC	mg/kg	<0.0020	<0.0020	<0.0020
	Dieldrin	mg/kg	<0.0020	<0.0020	<0.0020
	Endosulfan I	mg/kg	<0.0020	<0.0020	<0.0020
	Endosulfan II	mg/kg	<0.0020	<0.0020	<0.0020
	Endosulfan Sulfate	mg/kg	<0.0020	<0.0020	<0.0020
	Endrin	mg/kg	<0.0020	<0.0020	<0.0020
	Endrin aldehyde	mg/kg	<0.0020	<0.0020	<0.0020
	Heptachlor	mg/kg	<0.0020	<0.0020	<0.0020
	Heptachlor epoxide	mg/kg	<0.0020	<0.0020	<0.0020
	Lindane	mg/kg	<0.0020	<0.0020	<0.0020
	pp'-DDD	mg/kg	<0.0020	<0.0020	<0.0020
	pp'-DDE	mg/kg	<0.0020	<0.0020	<0.0020
	pp'-DDT	mg/kg	<0.0020	<0.0020	<0.0020
	PCB 1016	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1221	mg/kg	<0.0300	<0.0300	<0.0300
	PCB 1232	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1242	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1248	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1254	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1260	mg/kg	<0.0150	<0.0150	<0.0150
	Toxaphene	mg/kg	<0.0700	<0.0700	<0.0700

Non-radiological Surface Water Monitoring, 2003
Non-radiological Sediment Data

Sample Location:			SV-2047	SV-327	SV-175	Duplicate
Sample Date:			5/28/03	5/28/03	5/28/03	5/28/03
Metals and TOC	TKN	mg/kg	620	920	2800	620
	Total Phosphorus	mg/kg	210	200	600	350
	Percent Volatile Solids	%	3	5	8	3
	Cadmium	mg/kg	<1.0	<1.0	1.4	<1.0
	Chromium	mg/kg	2.7	2.8	13	3.1
	Copper	mg/kg	<1.0	<1.0	3.9	<1.0
	Lead	mg/kg	<5.0	<5.0	15	5
VOC's	Nickel	mg/kg	<2.0	<2.0	4.1	8.8
	Zinc	mg/kg	6.5	11	54	3.9
	Mercury	mg/kg	<0.25	<0.25	<0.25	<0.25
	1,1,1-Trichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1,2,2-Tetrachloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1,2-Trichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1-Dichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,1-Dichloroethene	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,2-Dichloroethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	1,2-Dichloropropane	mg/kg	<0.020	<0.020	<0.020	<0.020
	2-Butanone	mg/kg	<0.020	<0.020	<0.020	<0.020
	2-Hexanone	mg/kg	<0.020	<0.020	<0.020	<0.020
	4-Methyl-2-Pentanone	mg/kg	<0.020	<0.020	<0.020	<0.020
	Acetone	mg/kg	<0.050	<0.050	<0.050	<0.050
	Benzene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Bromodichloromethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	Bromoform	mg/kg	<0.020	<0.020	<0.020	<0.020
	Bromomethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	Carbon Disulfide	mg/kg	<0.020	<0.020	<0.020	<0.020
	Carbon tetrachloride	mg/kg	<0.020	<0.020	<0.020	<0.020
	cis-1,2Dichloroethylene	mg/kg	<0.020	<0.020	<0.020	<0.020
	cis-1,3-Dichloropropene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Dibromochloromethane	mg/kg	<0.020	<0.020	<0.020	<0.020
	Ethyl benzene	mg/kg	<0.020	<0.020	<0.020	<0.020
	m,p-xylenes	mg/kg	<0.040	<0.040	<0.040	<0.040
	o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Styrene	mg/kg	<0.020	<0.020	<0.020	<0.020
	Tetrachloroethene	mg/kg	<0.020	<0.020	<0.020	<0.020

Non-radiological Surface Water Monitoring, 2003
Non-radiological Sediment Data

Sample Location:		SV-2047	SV-327	SV-175	Duplicate
Sample Date:		5/28/03	5/28/03	5/28/03	5/28/03
VOCs Continued	Toluene	mg/kg	<0.020	<0.020	<0.020
	trans-1,2-Dichloroethene	mg/kg	<0.020	<0.020	<0.020
	trans-1,3-Dichloropropene	mg/kg	<0.020	<0.020	<0.020
	Trichlorethene	mg/kg	<0.020	<0.020	<0.020
	Vinyl chloride	mg/kg	<0.020	<0.020	<0.020
Pesticides/PCB	Aldrin	mg/kg	<0.0020	<0.0020	<0.0020
	alpha-BHC	mg/kg	<0.0020	<0.0020	<0.0020
	beta-BHC	mg/kg	<0.0020	<0.0020	<0.0020
	Chlordane	mg/kg	<0.015	<0.015	<0.015
	delta-BHC	mg/kg	<0.0020	<0.0020	<0.0020
	Dieldrin	mg/kg	<0.0020	<0.0020	<0.0020
	Endosulfan I	mg/kg	<0.0020	<0.0020	<0.0020
	Endosulfan II	mg/kg	<0.0020	<0.0020	<0.0020
	Endosulfan Sulfate	mg/kg	<0.0020	<0.0020	<0.0020
	Endrin	mg/kg	<0.0020	<0.0020	<0.0020
	Endrin aldehyde	mg/kg	<0.0020	<0.0020	<0.0020
	Heptachlor	mg/kg	<0.0020	<0.0020	<0.0020
	Heptachlor epoxide	mg/kg	<0.0020	<0.0020	<0.0020
	Lindane	mg/kg	<0.0020	<0.0020	<0.0020
	pp'-DDD	mg/kg	<0.0020	<0.0020	<0.0020
	pp'-DDE	mg/kg	<0.0020	<0.0020	0.0090
	pp'-DDT	mg/kg	<0.0020	<0.0020	<0.0020
	PCB 1016	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1221	mg/kg	<0.0300	<0.0300	<0.0300
	PCB 1232	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1242	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1248	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1254	mg/kg	<0.0150	<0.0150	<0.0150
	PCB 1260	mg/kg	<0.0150	<0.0150	<0.0150
	Toxaphene	mg/kg	<0.0700	<0.0700	<0.0700

Non-radiological Surface Water Monitoring, 2003
2003 ESOP and DOE-SR Data Comparison

E S O P S a m p l e L o c a t i o n :		S V - 2 0 2 7		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
pH	su	5.49	6.26	5.02
DO	mg/L	7.83	9.1	6.09
Water Temperature	celsius	16.4	21.9	11.1
TSS	mg/L	4	6.8	1.2
Total Phosphorus	mg/L	0.026	0.026	<0.020
NO ₃ NO ₂	mg/L	0.20	0.28	0.064
Mercury	mg/L	<0.00020	<0.00020	<0.00020
Cadmium	mg/L	<0.010	<0.010	<0.010
Chromium	mg/L	<0.010	<0.010	<0.010
Copper	mg/L	0.02	0.02	<0.010
Iron	mg/L	0.295	0.45	0.18
Lead	mg/L	<0.050	<0.050	<0.050
Manganese	mg/L	<0.010	<0.010	<0.010
Nickel	mg/L	<0.020	<0.020	<0.020
Zinc	mg/L	<0.010	<0.010	<0.010
TOC	mg/L	3.5	3.8	<2.0

Notes:

1. All numbers are based on absolute values not including non-detects.

S R S S a m p l e L o c a t i o n :		* U 3 R - 1 A		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
pH	su	5.7	6.6	3.5
DO	mg/L	9.8	14.4	7.8
Water Temperature	celsius	17	21	10
TSS	mg/L	3.75	5	1
Total Phosphorus	mg/L	0.037556	0.087	0.012
NO ₃ NO ₂	mg/L	0.480833	1.8	0.12
Mercury	ug/L	0.0794	0.14	0.012
Cadmium	mg/L	0.002267	0.005	0.0002
Chromium	mg/L	0.001	0.001	0.001
Copper	mg/L	0.006	0.012	0.001
Iron	mg/L	0.429667	0.779	0.178
Lead	mg/L	0.004	0.004	0.004
Manganese	mg/L	0.0145	0.034	0.008
Nickel	mg/L	0.007	0.009	0.004
Zinc	mg/L	0.07925	0.135	0.011
TOC	mg/L	2.836364	5.1	1.2

Notes:

1. ND = Not Detected
2. *from W SRC, 2004

Non-radiological Surface Water Monitoring, 2003
2003 ESOP and DOE-SR Data Comparison

E S O P S a m p l e L o c a t i o n :		S V - 3 2 4		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
p H	s u	6 . 4	6 . 9 0	5 . 5
D O	m g / L	7 . 9 3	1 0 . 0	6 . 4 4
W a t e r T e m p e r a t u r e	c e l s i u s	1 6 . 7 8	2 3 . 2	8 . 2
T S S	m g / L	6 . 0 6	1 8	1 . 5
T o t a l P h o s p h o r u s	m g / L	0 . 0 5	0 . 2	0 . 0 2 3
N O 3 N O 2	m g / L	0 . 3 0	2 . 5	0 . 0 3 7
M e r c u r y	m g / L	< 0 . 0 0 0 2 0	< 0 . 0 0 0 2 0	< 0 . 0 0 0 2 0
C a d m i u m	m g / L	< 0 . 0 1 0	< 0 . 0 1 0	< 0 . 0 1 0
C h r o m i u m	m g / L	< 0 . 0 1 0	< 0 . 0 1 0	< 0 . 0 1 0
C o p p e r	m g / L	< 0 . 0 1 0	< 0 . 0 1 0	< 0 . 0 1 0
I r o n	m g / L	1	2	1
L e a d	m g / L	< 0 . 0 5 0	< 0 . 0 5 0	< 0 . 0 5 0
M a n g a n e s e	m g / L	0 . 1	0	0
N i c k e l	m g / L	< 0 . 0 2 0	< 0 . 0 2 0	< 0 . 0 2 0
Z i n c	m g / L	0	0 . 1 2	0 . 1 2
T O C	m g / L	4 . 4 0	6 . 2	2 . 2

N o t e s :

1. All numbers are based on absolute values not including non-detects.

S R S S a m p l e L o c a t i o n :		* T B - 5		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
p H	s u	6 . 1 9 1 6 7	6 . 9	4 . 5
D O	m g / L	1 0 . 1 1	1 5 . 6 6	7 . 4
W a t e r T e m p e r a t u r e	c e l s i u s	1 8 . 1 1 6 7	2 4	7
T S S	m g / L	1 0 . 1 6 6 7	3 5	1
T o t a l P h o s p h o r u s	m g / L	0 . 0 8 6 3 3	0 . 2 1	0 . 1 7
N O 3 N O 2	m g / L	0 . 0 9 7 7 3	0 . 1 5	0 . 0 3 3
M e r c u r y	u g / L	0 . 0 7 3 5 7	0 . 1 3	0 . 0 1 2
C a d m i u m	m g / L	0 . 0 0 1 8 1	0 . 0 0 5	0 . 0 0 0 1
C h r o m i u m	m g / L	0 . 0 0 2 2 5	0 . 0 0 3	0 . 0 0 1
C o p p e r	m g / L	0 . 0 0 7 5 7	0 . 0 2 2	0 . 0 0 1
I r o n	m g / L	2 . 2 0 7 0 8	3 . 0 9 1	0 . 7 6 4
L e a d	m g / L	0 . 0 0 3	0 . 0 0 3	0 . 0 0 3
M a n g a n e s e	m g / L	0 . 1 0 7 1 7	0 . 1 9 5	0 . 1 0 7 1 7
N i c k e l	m g / L	0 . 0 1 7 5 5	0 . 0 2 8	0 . 0 0 8
Z i n c	m g / L	0 . 0 2 4	0 . 0 2 4	0 . 0 2 4
T O C	m g / L	7 . 3 1 6 6 7	1 2	2 . 5

N o t e s :

1. N D = N o t D e t e c t e d
 2. * f r o m W S R C , 2 0 0 4

Non-radiological Surface Water Monitoring, 2003
2003 ESOP and DOE-SR Data Comparison

E S O P S a m p l e L o c a t i o n :		S V - 3 2 5		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
p H	s u	6 . 4	7 . 4 7	5 . 3
D O	m g / L	7 . 8 0	1 0 . 2	5 . 2 5
W a t e r T e m p e r a t u r e	c e l s i u s	1 7 . 3 6	2 3 . 6	7 . 6
T S S	m g / L	6 . 5 8	1 1	3 . 0
T o t a l P h o s p h o r u s	m g / L	0 . 0 3	0 . 0 3 6	0 . 0 2 4
N O 3 N O 2	m g / L	0 . 1 2	0 . 2	0 . 0 5 4
M e r c u r y	m g / L	0 . 1 2	0 . 2	0 . 0 5 4
C a d m i u m	m g / L	< 0 . 0 1 0	< 0 . 0 1 0	< 0 . 0 1 0
C h r o m i u m	m g / L	< 0 . 0 1 0	< 0 . 0 1 0	< 0 . 0 1 0
C o p p e r	m g / L	0 . 0 2	0 . 0 2	0 . 0 2
I r o n	m g / L	0 . 4 7	0 . 7 8	0 . 2 3
L e a d	m g / L	< 0 . 0 5 0	< 0 . 0 5 0	< 0 . 0 5 0
M a n g a n e s e	m g / L	0 . 0 2 1	0 . 0 2 2	0 . 0 2 1
N i c k e l	m g / L	< 0 . 0 2 0	< 0 . 0 2 0	< 0 . 0 2 0
Z i n c	m g / L	0 . 0 1 7	0 . 0 1 7	0 . 0 1 7
T O C	m g / L	4 . 4 7	6 . 2	2

N o t e s :

1. All numbers are based on absolute values not including non-detects.

S R S S a m p l e L o c a t i o n :		* U 3 R - 4		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
p H	s u	6 . 1 8 8 8 9	6 . 5	4 . 9
D O	m g / L	1 0 . 1 1	7 2 . 8 2	7 . 6
W a t e r T e m p e r a t u r e	c e l s i u s	1 7 . 6 6 6 7	2 4	1 0
T S S	m g / L	2 2 . 3 3 3	7 8	1
T o t a l P h o s p h o r u s	m g / L	0 . 0 8 8 3 8	0 . 2 1	0 . 0 1 9
N O 3 N O 2	m g / L	0 . 1 2 2 2 2	0 . 1 8	0 . 0 2 7
M e r c u r y	u g / L	0 . 1 0 4 8	0 . 1 4 4	0 . 0 2 7
C a d m i u m	m g / L	0 . 0 0 0 1 6	0 . 0 0 1	0 . 0 0 0 1
C h r o m i u m	m g / L	0 . 0 0 1	0 . 0 0 1	0 . 0 0 1
C o p p e r	m g / L	0 . 0 1 4 5	0 . 0 2 8	0 . 0 0 1
I r o n	m g / L	0 . 8 3 4 6 7	1 . 6 6 4	0 . 2 4
L e a d	m g / L	0	0	0
M a n g a n e s e	m g / L	0 . 0 2 7 2 5	0 . 0 4 5	0 . 0 0 7
N i c k e l	m g / L	0 . 0 0 6 1 7	0 . 0 0 8	0 . 0 0 4
Z i n c	m g / L	0 . 0 1 4	0 . 0 1 4	0 . 0 1 4
T O C	m g / L	8 . 2 8 7 5	1 6	2 . 6

N o t e s :

1. N D = N o t D e t e c t e d
 2. * f r o m W S R C , 2 0 0 4

**Non-radiological Surface Water Monitoring, 2003
2003 ESOP and DOE-SR Data Comparison**

E S O P S a m p l e L o c a t i o n :		S V - 3 2 7		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
p H	s u	7 . 0 2	7 . 8 8	6 . 0 1
D O	m g / L	8 . 0 0	1 0 . 0	6 . 0 1
W a t e r T e m p e r a t u r e	c e l s i u s	1 8 . 2 4	2 5 . 6	8 . 3
T S S	m g / L	9 . 6 6	3 2	3 . 1
T o t a l P h o s p h o r u s	m g / L	0 . 0 3 9	0 . 0 4 0	0 . 0 3 7
N O 3 N O 2	m g / L	0 . 0 7	0 . 1 3	0 . 0 4
M e r c u r y	m g / L	< 0 . 0 0 0 2 0	< 0 . 0 0 0 2 0	< 0 . 0 0 0 2 0
C a d m i u m	m g / L	< 0 . 0 1 0	< 0 . 0 1 0	< 0 . 0 1 0
C h r o m i u m	m g / L	< 0 . 0 1 0	< 0 . 0 1 0	< 0 . 0 1 0
C o p p e r	m g / L	0 . 0 2	0 . 0 1 5	0 . 0 1 5
I r o n	m g / L	1 . 1 7	1 . 7 0	0 . 4 0
L e a d	m g / L	< 0 . 0 5 0	< 0 . 0 5 0	< 0 . 0 5 0
M a n g a n e s e	m g / L	0 . 1 7	0 . 2 6	0 . 0 3
N i c k e l	m g / L	< 0 . 0 2 0	< 0 . 0 2 0	< 0 . 0 2 0
Z i n c	m g / L	0 . 0 2 6	0 . 0 2 8	0 . 0 2 4
T O C	m g / L	6 . 3 0	8 . 8	3 . 8

N o t e s :

1. All numbers are based on absolute values not including non-detects.

S R S S a m p l e L o c a t i o n :		* S C - 4		
S a m p l e D a t e	u n i t s	M e a n	M a x i m u m	M i n i m u m
p H	s u	6 . 3 7 5	6 . 8	5 . 2
D O	m g / L	9 . 6	1 3 . 6	6 . 9
W a t e r T e m p e r a t u r e	c e l s i u s	1 9 . 0 8	2 5	9
T S S	m g / L	8 . 9 1 6 6 7	4 1	1
T o t a l P h o s p h o r u s	m g / L	0 . 0 5 1 7 8	0 . 1	0 . 0 1 2
N O 3 N O 2	m g / L	0 . 0 6 8 1 7	0 . 1 3	0 . 0 3 4
M e r c u r y	u g / L	0 . 0 6 7 8 3	0 . 1 2 6	0 . 0 1 5
C a d m i u m	m g / L	0 . 0 0 4	0 . 0 0 0 1	0 . 0 0 1 6
C h r o m i u m	m g / L	0 . 0 0 1 4	0 . 0 0 2	0 . 0 0 1
C o p p e r	m g / L	0 . 0 1 5 1 1	0 . 0 5 1	0 . 0 0 1
I r o n	m g / L	1 . 0 3 4 5	2 . 4 9 4	0 . 3 2 9
L e a d	m g / L	0	0	0
M a n g a n e s e	m g / L	0 . 1 0 9 9 2	0 . 2 8 5	0 . 0 4 3
N i c k e l	m g / L	0 . 0 0 6 1 3	0 . 0 0 8	0 . 0 0 4
Z i n c	m g / L	0 . 0 3 6	0 . 0 4 8	0 . 0 1 2
T O C	m g / L	8 . 5 8 3 3	1 4	3 . 5

N o t e s :

1. N D = N o t D e t e c t e d
2. *from W S R C , 2 0 0 4

2.4.5 Summary Statistics

Non-radiological Surface Water Monitoring, 2003

Sample Location:		SV-2027 (Upper Three Runs)						
		units	Maximum	Minimum	Median	Mean	Standard Deviation	N
Monthly Parameters	pH	su	6.26	5.02	5.39	5.49	0.38	10
	DO	mg/L	9.1	6.09	7.86	7.72	0.93	10
	Water Temperature	celsius	21.9	11.1	17.15	17.26	3.91	12
	Conductivity	µS/cm	0.087	0.019	0.043	0.05	0.02	12
	Alkalinity	mg/L	15	1.1	1.5	5	6.85	12
	Turbidity	NTU	2.4	1.1	1.4	1.6	0.47	12
	BOD ₅	mg/L	6.6	2.5	4.4	4.6	1.39	12
	TSS	mg/L	6.8	1.2	4.6	4.2	1.66	12
	Fecal Coliform(MFC)	FC/100mL	300	100	110	144	88	12
	NH ₃ NH ₄	mg/L	0.23	0.072	0.120	0.132	0.052	12
	NO ₃ NO ₂	mg/L	0.280	0.06	0.21	0.201	0.06	12
	TKN	mg/L	0.77	0.18	0.32	0.41	0.19	12
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.026	<0.020	NA	NA	NA	12
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Copper	mg/L	0.02	<0.010	NA	NA	NA	4
	Iron	mg/L	0.45	0.18	0.275	0.30	0.128	4
	Lead	mg/L	<0.050	<0.050	NA	NA	NA	4
	Manganese	mg/L	<0.010	<0.010	NA	NA	NA	4
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA	4
	Zinc	mg/L	<0.010	<0.010	NA	NA	NA	4
	Mercury	mg/L	<0.00020	<0.00020	NA	NA	NA	4
	TOC	mg/L	3.8	<20	3.5	3.5	0.42	4

Summary Statistics
Non-radiological Surface Water Monitoring, 2003

Sample Location: SV-324 (Tim's Branch)		units	Maximum	Minimum	Median	Mean	Standard Deviation	N
Monthly Parameters	pH	su	6.90	5.54	6.285	6.38	0.56	11
	DO	mg/L	10.01	6.44	7.94	7.93	1.11	10
	Water Temperature	celsius	23.2	8.2	16.1	16.8	5.3	12
	Conductivity	µS/cm	0.108	0.02	0.026	0.0335	0.026	12
	Alkalinity	mg/L	11	3	4.85	5.5	2.42	12
	Turbidity	NTU	6	1.4	3.3	3.5	1.5	12
	BOD ₅	mg/L	5.5	2.8	4.2	4.2	1.4	12
	TSS	mg/L	18	1.5	5.6	6.06	4.7	12
	Fecal Coliform(MFC)	FC/100mL	290	200	270	257.5	40	12
	NH ₃ NH ₄	mg/L	0.15	0.053	0.087	0.099	0.042	12
	NO ₃ NO ₂	mg/L	2.5	0.037	0.076	0.298	0.73	12
	TKN	mg/L	1.1	0.18	0.34	0.44	0.26	12
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.2	0.023	0.034	0.053	0.06	12
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Copper	mg/L	<0.010	<0.010	NA	NA	NA	4
	Iron	mg/L	2.3	0.61	1.3	1.4	0.8	4
	Lead	mg/L	<0.050	<0.050	NA	NA	NA	4
	Manganese	mg/L	0.12	0.052	0.064	0.075	0.031	4
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA	4
	Zinc	mg/L	0.12	0.12	NA	NA	NA	4
	Mercury	mg/L	<0.00020	<0.00020	NA	NA	NA	4
	TOC	mg/L	6.2	2.2	4.6	4.4	2.1	4

Summary Statistics
Non-radiological Surface Water Monitoring, 2003

Sample Location: SV-326 (Four Mile Creek)							
		units	Maximum	Minimum	Median	Mean	Standard Deviation
Monthly Parameters	pH	su	7.57	6.01	6.745	6.83	0.557
	DO	mg/L	10.1	5.21	7.83	7.68	1.563
	Water Temperature	celsius	24.9	7.7	17	17.5	6
	Conductivity	mS/cm	0.109	0.046	0.062	0.067	0.020
	Alkalinity	mg/L	22	2.6	13	13.6	5
	Turbidity	NTU	7.5	2.3	3.45	3.8	1.5
	BOD ₅	mg/L	4.6	2	2	3.3	1.8
	TSS	mg/L	41	2	5	8.05	11.7
	Fecal Coliform(MFC)	FC/100mL	170	100	120	130	36
	NH ₃ NH ₄	mg/L	0.17	0.051	0.089	0.092	0.043
	NO ₃ NO ₂	mg/L	1.9	0.15	0.595	0.75	0.551
	TKN	mg/L	0.92	0.14	0.385	0.45	0.21
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.2	0.065	0.12	0.126	0.05
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA
	Copper	mg/L	<0.010	<0.010	NA	NA	NA
	Iron	mg/L	2.00	0.57	0.995	1.14	0.613
	Lead	mg/L	<0.050	<0.050	NA	NA	NA
	Manganese	mg/L	0.12	0.023	0.105	0.088	0.044
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA
	Zinc	mg/L	0.037	0.018	0.028	0.028	0.013
	Mercury	mg/L	<0.00020	<0.00020	NA	NA	NA
	TOC	mg/L	6.2	4.3	5.7	5.4	0.985

Summary Statistics
Non-radiological Surface Water Monitoring, 2003

Sample Location: SV-325 (Upper Three Runs)		units	Maximum	Minimum	Median	Mean	Standard Deviation	N
Monthly Parameters	pH	su	7.47	5.27	6.17	6.43	0.77	12
	DO	mg/L	10.17	5.25	8.08	7.80	1.50	11
	Water Temperature	celsius	23.6	7.6	17	17.4	5.76	12
	Conductivity	µS/cm	0.171	0.018	0.0225	0.038	0.05	12
	Alkalinity	mg/L	15	1.2	2.8	3.7	3.84	12
	Turbidity	NTU	4.6	1.1	2.15	2.5	1.26	12
	BOD ₅	mg/L	6.5	4.4	5	5.3	1.08	12
	TSS	mg/L	11	3	5.8	6.58	2.72	11
	Fecal Coliform(MFC)	FC/100mL	180	50	150	127	53.45	12
	NH ₃ NH ₄	mg/L	0.26	0.06	0.08	0.103	0.07	12
	NO ₃ NO ₂	mg/L	0.2	0.054	0.11	0.12	0.04	12
	TKN	mg/L	0.65	0.13	0.41	0.40	0.16	12
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.036	0.024	0.028	0.028	0.005	12
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Copper	mg/L	0.02	0.02	NA	NA	NA	4
	Iron	mg/L	0.78	0.23	0.435	0.47	0.247	4
	Lead	mg/L	<0.050	<0.050	NA	NA	NA	4
	Manganese	mg/L	0.022	0.021	0.021	0.021	0.001	4
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA	4
	Zinc	mg/L	0.017	0.017	NA	NA	NA	4
	Mercury	mg/L	0.00021	0.00021	NA	NA	NA	4
	TOC	mg/L	6.2	2.0	5.2	4.5	2.194	4

Summary Statistics
Non-radiological Surface Water Monitoring, 2003

Sample Location:		SV-2047 (Pen Branch)						
		units	Maximum	Minimum	Median	Mean	Standard Deviation	N
Monthly Parameters	pH	su	7.98	5.51	6.72	6.83	0.65	12
	DO	mg/L	10.06	6.09	8.02	8.11	1.07	10
	Water Temperature	celsius	24.6	8.1	17.8	18.0	5.8	12
	Conductivity	µS/cm	0.129	0.041	0.052	0.064	0.027	12
	Alkalinity	mg/L	46	12	15	18	10	12
	Turbidity	NTU	5	1.8	3.2	3.2	1.2	12
	BOD ₅	mg/L	7.2	2.9	5.8	5.0	1.9	12
	TSS	mg/L	11	1.6	3.8	5.1	3.1	10
	Fecal Coliform(MFC)	FC/100mL	120	95	100	109	12	12
	NH ₃ NH ₄	mg/L	0.23	0.062	0.1	0.11	0.062	12
	NO ₃ NO ₂	mg/L	0.41	0.059	0.096	0.139	0.102	12
	TKN	mg/L	0.84	0.29	0.43	0.47	0.17	12
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.04	0.021	0.023	0.026	0.008	12
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Copper	mg/L	0.015	0.015	NA	NA	NA	4
	Iron	mg/L	1.7	0.45	0.47	0.87	0.72	4
	Lead	mg/L	<0.050	<0.050	NA	NA	NA	4
	Manganese	mg/L	0.18	0.018	0.046	0.081	0.087	4
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA	4
	Zinc	mg/L	0.11	0.012	0.061	0.061	0.069	4
	Mercury	mg/L	0	0	NA	NA	NA	4
	TOC	mg/L	9	4.1	5.2	6.1	2.6	4

Summary Statistics
Non-radiological Surface Water Monitoring, 2003

Sample Location:		SV-327 (Steel Creek)						
		units	Maximum	Minimum	Median	Mean	Standard Deviation	N
Monthly Parameters	pH	su	7.88	6.01	6.96	7.02	0.570	12
	DO	mg/L	10.04	6.01	7.99	8.00	1.298	10
	Water Temperature	celsius	25.6	8.3	17.85	18.2	5.924	12
	Conductivity	µS/cm	0.098	0.05	0.057	0.062	0.016	12
	Alkalinity	mg/L	21	12	18	18	3.232	12
	Turbidity	NTU	3.4	1.4	1.6	2.0	0.717	12
	BOD ₅	mg/L	5.9	2.3	3.5	3.9	1.833	12
	TSS	mg/L	32	3.1	3.8	9.7	10.444	11
	Fecal Coliform(MFC)	FC/100mL	160	46	46	103	80.610	11
	NH ₃ NH ₄	mg/L	0.077	0.051	0.0615	0.064	0.010	12
	NO ₃ NO ₂	mg/L	0.13	0.035	0.063	0.069	0.030	12
	TKN	mg/L	1.2	0.33	0.405	0.54	0.291	12
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.040	0.037	0.037	0.039	0.002	12
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Copper	mg/L	0.015	0.015	NA	NA	NA	4
	Iron	mg/L	1.70	0.40	1.4	1.17	0.68	4
	Lead	mg/L	<0.050	<0.050	NA	NA	NA	4
	Manganese	mg/L	0.26	0.029	0.22	0.170	0.123	4
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA	4
	Zinc	mg/L	0.028	0.024	0.026	0.026	0.003	4
	Mercury	mg/L	<0.00020	<0.00020	NA	NA	NA	4
	TOC	mg/L	8.8	3.8	6.3	6.3	3.5	4

Summary Statistics
Non-radiological Surface Water Monitoring, 2003

Sample Location: SV-175 (Lower Three Runs)		units	Maximum	Minimum	Median	Mean	Standard Deviation	N
Monthly Parameters	pH	su	7.68	6.21	6.795	6.961	0.512	10
	DO	mg/L	10.52	6.78	7.93	8.04	1.16	11
	Water Temperature	celsius	25.7	8.4	17.35	18.1	6.5	11
	Conductivity	µS/cm	0.46	0.022	0.073	0.111	0.127	11
	Alkalinity	mg/L	59	22	30	34	11	11
	Turbidity	NTU	3.8	1.6	2.7	2.5	0.9	11
	BOD ₅	mg/L	5.9	5.3	5.4	5.5	0.3	10
	TSS	mg/L	56	0.6	4.6	11.0	17.2	10
	Fecal Coliform(MFC)	FC/100mL	340	90	150	191	103	11
	NH ₃ NH ₄	mg/L	0.15	0.057	0.093	0.099	0.037	11
	NO ₃ NO ₂	mg/L	0.1	0.03	0.07	0.07	0.02	11
	TKN	mg/L	0.8	0.2	0.4	0.5	0.2	11
Quarterly Metals and TOC	Total Phosphorus	mg/L	5.2	0.022	0.030	0.891	2.111	11
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Copper	mg/L	0.014	0.014	NA	NA	NA	4
	Iron	mg/L	1	0.39	0.39	0.59	0.35	4
	Lead	mg/L	<0.050	<0.050	NA	NA	NA	4
	Manganese	mg/L	0.12	0.035	0.059	0.071	0.044	4
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA	4
	Zinc	mg/L	0	0	NA	NA	NA	4
	Mercury	mg/L	<0.00020	<0.00020	NA	NA	NA	4
	TOC	mg/L	11	5.2	5.9	7.4	3.2	4

Summary Statistics
Non-radiological Surface Water Monitoring, 2003

Sample Location:		Blind Duplicate						
		units	Maximum	Minimum	Median	Mean	Standard Deviation	N
Monthly Parameters	pH	su	NA	NA	NA	NA	NA	NA
	DO	mg/L	NA	NA	NA	NA	NA	NA
	Water Temperature	celsius	NA	NA	NA	NA	NA	NA
	Conductivity	µS/cm	NA	NA	NA	NA	NA	NA
	Alkalinity	mg/L	36	1	3.2	10.629	12.778	12
	Turbidity	NTU	3.1	1	1.65	2.057	0.943	12
	BOD ₅	mg/L	2.2	2.2	NA	NA	NA	12
	TSS	mg/L	19	3.4	7.5	9.5	5.9	11
	Fecal Coliform(MFC)	FC/100mL	140	110	130	127	15	12
	NH ₃ NH ₄	mg/L	0.23	0.078	0.094	0.136	0.068	12
	NO ₃ NO ₂	mg/L	0.22	0.024	0.14	0.123	0.076	12
	TKN	mg/L	1	0.26	0.36	0.543	0.360	12
Quarterly Metals and TOC	Total Phosphorus	mg/L	0.033	0.032	0.033	0.033	0.001	12
	Cadmium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Chromium	mg/L	<0.010	<0.010	NA	NA	NA	4
	Copper	mg/L	0.016	0.016	NA	NA	NA	4
	Iron	mg/L	6.3	0.34	1.0	2.55	3.27	4
	Lead	mg/L	<0.050	<0.050	NA	NA	NA	4
	Manganese	mg/L	0.6	0.12	0.36	0.360	0.34	4
	Nickel	mg/L	<0.020	<0.020	NA	NA	NA	4
	Zinc	mg/L	0.071	0.071	NA	NA	NA	4
	Mercury	mg/L	<0.00020	<0.00020	NA	NA	NA	4
	TOC	mg/L	9.9	2.1	9.6	7.2	4.4	4

3.1 Radiological Surveillance of Surface Soils On and Adjacent to SRS

3.1.1 Summary

The Environmental Surveillance and Oversight Program (ESOP) soils project was implemented to identify and sample surface soils near the site perimeter (on-site and off-site), establish background levels in the local area, and compare results to the Department of Energy –Savannah River (DOE-SR) data. ESOP sampled a target analyte list of 23 metals, radioactive technetium-99 (Tc-99), and 25 gamma radionuclides in soils for 2003. ESOP data is available to the public regarding SRS activities and any potential impacts to public health and the environment.

RESULTS AND DISCUSSION

Non-radiological and radiological soil results are listed in the Data section for Radiological Surveillance of Surface Soils (section 3.1.4). Tables and figures are located in section 3.1.3. Table 1 gives a list of radionuclides and metals analyzed, and table 2 shows sampling locations.

Non-radiological

No analytical soil metal results exceeded their preliminary remedial goals (PRG) except for cadmium. The SCDHEC Analytical Services Division Laboratory lower limit of detection (LLD) for arsenic and thallium is not sufficient enough to detect the new cancer PRG. But will detect the non-cancer (toxic) PRG of 37 parts per million (ppm) of cadmium based on the United States Environmental Protection Agency (USEPA) PRG levels. The natural concentrations of a few metals will exceed the recommended PRG levels in some soil types. PRG levels are site specific and will only serve in this context as a general frame of reference. Future studies of arsenic, cadmium, thallium, and mercury should seek reduced LLDs for these elements.

The BWL-009 location on SRS had the highest cadmium concentration (4.3 ppm). This location is near SRS road A-13 and Risher Pond Road, and south of the 115-kv transmission line on the east side of A-13. This is within one mile of the D area demolitions and within 3 miles of a commercial nuclear station. Also, there are several coal-fired power plants within SRS. The P-26 well cluster is close to the BWL-009 area, and ESOP did not detect cadmium in the ground water at this location (<0.0001 ppm) in 2003.

The average cadmium level in soil within the State of South Carolina is 1 ppm, plus or minus 1.8 ppm (1 standard deviation (SD)). Thus, all of the cadmium levels detected by ESOP are within 3 SD of the state average and seem to represent normal occurrences of cadmium in soil. The coastal plain soils concentrations, typical of the SRS perimeter, are characteristically less than the carcinogenic (1.7 ppm) and toxicity (37 ppm) PRG levels utilized by the EPA in soil remediations.

Increased randomized soil sampling and soil profiles of the perimeter and background areas may be added in the future for possible correlation studies of these elements. Most of the non-radionuclide concentration increases occur at the >25 miles to >50 mile soil locations where different soil profiles in the piedmont begin to intrude into the sample surveys of the coastal plain area. Antimony, beryllium, silver, selenium and thalium do not exceed the Minimum

Detectable Concentration (MDC) at any location. The 1 to 4 ft median averages are generally higher than the 0 to 1 ft. concentrations in the overall interval median average from the 0 to 12-mile interval perimeter through the background location. Some of the metals with higher concentrations at deeper depths represent readily leachable elements in those soils. The exceptions occur in the background (Mn, Pb), the >25 to 36-mile interval (As, Cu, and Zn), and the >35 to 50-mile interval (Al, Fe, Ba, Ca, Cd, Cr, Cu, Pb, and V) where a reversal of this trend is noted for the listed metals. The >36 to 50-mile interval medians reflect a different soil type or characteristic. Manganese stands out as the only element that reverses the trend and seems to be less leachable than the other elements. Manganese is more concentrated at the surface than in the deeper depths of the closest perimeter intervals to the SRS (0 to 12-miles and >12 to 25-miles). The soil elements depth concentrations then define four intervals (the 0 to 25-mile interval, the >25 to 36-mile interval, the >35 to 50-mile interval, and the background) as possibly having different soil characteristics. The >25 to 36-mile interval soil samples were visibly richer in clay material, which would slow or prevent leaching of surface contaminants into the deeper depths. Future random sampling should help to clarify any probabilistic relationships in soil characteristics.

Radiological

Technetium-99 (Tc-99)

Tc-99 occurs naturally in very small amounts, but man-made sources produce larger amounts (nuclear detonations, reactor emissions, fuel processing, treatment and storage). The only ESOP SRS perimeter Tc-99 detect was 5.16 picocuries per gram (pCi/g) (± 1.30 pCi/g) at the AKN-004 location on Greenpond Road near the Greenpond/SRS gate (section 3.1.4). The background (0.336 pCi/g ± 1.0 pCi/g) was not established since it was below the MDA of 1.54 pCi/g. SRS did not measure any Tc-99 releases in soil, but did estimate the atmospheric releases at 11 curies from 1955 thru 1996, and estimated the dose to the MEI at the site boundary at approximately 0.1 millirem (mrem). The dose from liquid releases was 53 Ci or 0.01 mrem to the MEI from 1955 thru 1996. However, DOE-SR did find 2.52 pCi/L of Tc-99 in Savannah River water at river mile 118.8.

Gamma

Gamma scans of surface soils were last analyzed for gamma producing radionuclides in 1998 / 1999. In 2003 only potassium-40, cesium-137, and radium-226 had detects above the DOE-SR calculated one in a million risk-based PRG. The PRG are not standards, but are referenced here as recommended and desirable maximum contaminant levels in residential soil. Potassium-40 and radium-226 are naturally occurring, and the cesium-137 detects above background are within two SD of the background level. The Cs-137 detects are in part due to radioactive fallout deposits from nuclear tests. Potassium-40 is a globally prevalent radionuclide, and is one of several terrestrial and internal radiation sources that contribute to the total radioactivity dose from background radioactivity. The 2003 EPA general reference for residential soil PRG for K-40 is 0.138 pCi/g. All of the ESOP SRS perimeter (max of 3.930 at BWL-008), outer perimeter (max of 0.6725 pCi/g), and background samples (0.3548 pCi/g) were well above this PRG.

Potassium-40 averaged $0.927 \text{ pCi/g} \pm 1.007 \text{ pCi/g}$ in the 2003 ESOP soil samples. DOE-SR did not analyze for K-40 gamma in 2003 soils. Potassium-40, carbon-12, and radon-222 are major contributors to the background radiation dose, and considered as normal background public exposure. Therefore, the environment contains some natural ubiquitous hazards that contribute to cancer risks.

Radium-226 is the most common isotope of radium and is found in nature as part of the uranium decay series. Ra-226 decays to radon-220, and radon is an example of a daughter product with a substantial health risk. Only 20% of ingested radium enters the bloodstream, and can deposit in bones or is eliminated thru feces and urine. Long-term adverse health effects can lead to lymphoma, bone cancer, leukemia, and aplastic anemia. Air emissions and water standards limit the lifetime cancer risk to 2 in 10,000. The SRS site specific PRG is 0.896 pCi/g for Ra-226 or 0.0131 pCi/g for Ra-226 and its daughter products at the 1×10^{-6} cancer risk level. Not all ESOP locations reached the Ra-226 PRG level, but all locations including the background were above the Ra-226 PRG, which includes the daughter products of the radium decay. Radium-226 averaged $0.939 \text{ pCi/g} (\pm 0.428 \text{ pCi/g})$ in the 2003 ESOP soil samples. The following ESOP locations slightly exceeded the background concentration of 1.191 pCi/g at $\pm 0.325 \text{ pCi/g}$ (2sd): AKN-002 (1.224 pCi/g), BWL-009 (1.445 pCi/g), AKN-251 (1.319 pCi/g), AKN-253 (2.227 pCi/g), and ORG-251 (1.455 pCi/g). Radium and its decay products contribute to the natural background exposure. However, the dose above background greater than 3 SD (1.679 pCi/g) may be attributed to man-made sources or a change in soil type. Anthropogenic sources of radium come from uranium and uranium processing, reactor fuel, and target elements. The AKN-253 location Ra-226 concentration is almost twice the background location, and approximately 2.5 times the Ra-226 SRS site-specific PRG cancer risk level. The AKN-253 location sample was a roadside sample and may contain road material that includes Ra-226 contaminant. DOE-SR did not analyze for Ra-226 in 2003.

Cesium-137 is also a globally present radionuclide, but its elevated presence worldwide is mostly due to atmospheric deposition of fallout from nuclear tests (1960s and 1970s) and reactor failures. Cs-137 also comes from neutron-induced fission in reactors. Two incidents at SRS in 1955 and in 1987 released approximately 3.5 Ci of Cs-137 from 1955 thru 1996. The dose to the MEI was calculated at approximately 0.5 mrem. The 2003 DOE-SR surface soil samples highest average Cs-137 detect occurred at the D-area location ($0.290 \text{ pCi/g} \pm 0.0348 \text{ pCi/g}$).

Cesium-137 averaged $0.180 \text{ pCi/g} \pm 0.101 \text{ pCi/g}$ in the 2003 ESOP soil samples. The highest SRS perimeter detects by ESOP for Cs-137 were 0.858 pCi/L in 1998 at AKN-004 (Greenpond Road), 1.272 pCi/L in 1999 at AKN-004, and 0.350 pCi/L at the AKN-004 location in 2003. All of these detects are below the Cs-137 radioisotope's SRS 2003 PRG level of 23.4 pCi/g . However, most locations, including the background (0.1737 pCi/g), were above the SRS site specific PRG for Cs-137 and its daughter products (0.0605 pCi/g), and were also above the 1×10^{-6} cancer risk level. The background is approximately three times the 1×10^{-6} cancer risk levels for Cs-137 and its daughter products. Since this elevation occurs in the background, the Cs-137 levels may be partially due to past nuclear detonations that distributed fallout worldwide. Over half of the SRS perimeter locations were above the background level, indicating that SRS may have contributed to the Cs-137 levels above background within the 50-mile perimeter. The 2003 AKN-004 location (Greenpond Road) was the maximum at 0.3501 pCi/g . The outer

perimeter maximum (20 to 50 miles) was 0.2929 pCi/g at AKN-253 (Hwy 4) compared to a background near Darlington of 0.1737 pCi/g. These were all roadside samples and the road materials place of origin may have contributed to these results. The distribution of Cs-137 is

primarily due to weather patterns that deposited atmospheric releases according to wind direction and precipitation at the times of release whether from SRS or nuclear test fallout drift. Even the background exceeds the EPA recommended PRG for Cs-137 and its daughter products. The daughter products may contribute more in terms of the associated cancer risk at some future date on a percentage risk basis. The elevated soil levels mentioned do not violate soil standards, but are above desirable maximum contaminant soil concentrations cited in the EPA PRG tables.

CONCLUSIONS / RECOMMENDATIONS

A comparison of the non-radiological soil element average concentrations by region of South Carolina (Table 3, Section 3.1.3) with ESOP SRS perimeter results confirms that undisturbed SRS perimeter soils are typical of the South Carolina Coastal Plains soil type. All of the cadmium levels detected by ESOP were within 3 Std. Dev. of the state average. The higher metal detects were in the deeper profiles (1-4 ft) and in areas where piedmont soils intruded into the highly leachable soils of the coastal plain. The highest cadmium detect was internal to SRS, and does not represent a place of public exposure. The nearest well cluster sampled by ESOP (P-26) did not show detectable cadmium contamination.

Relationships may exist between certain metals and the soil profiles. Some elements may have a correlation (such as aluminum, iron, magnesium, potassium, and vanadium) in coastal plain soils (Figures 1 and 2, section 3.1.3). In general the soil element concentrations increase with depth possibly due to the leachate properties in sandy soils. Randomized soil sampling of perimeter and background elements in 2004 will help to determine relationships. Any soil cadmium levels approaching the EPA non-cancer end point of 37 ppm for soil remediation would warrant further investigation.

Potassium-40 and Ra-226 had detects that cannot be separated from the natural background exposure in soil and water. The Ra-226 levels may be related to road material since these samples were within 20 feet of paved or graveled roads. The K-40 levels varied from 1 to 11 times the background (0.3548 pCi/g), and K-40 represents only a fractional part of the total potassium in soils common to the coastal plain. Most Cs-137 detects may represent historical depositions due to nuclear tests instead of yearly deposited contamination from SRS. Future random sampling and historical radioactive deposition tracking data may help to resolve the question. If random environmental radioisotope detects in South Carolina also correspond to potential peaks where radioactive fallout tracking patterns cross, then the concentrations are probably historical depositions versus SRS depositions.

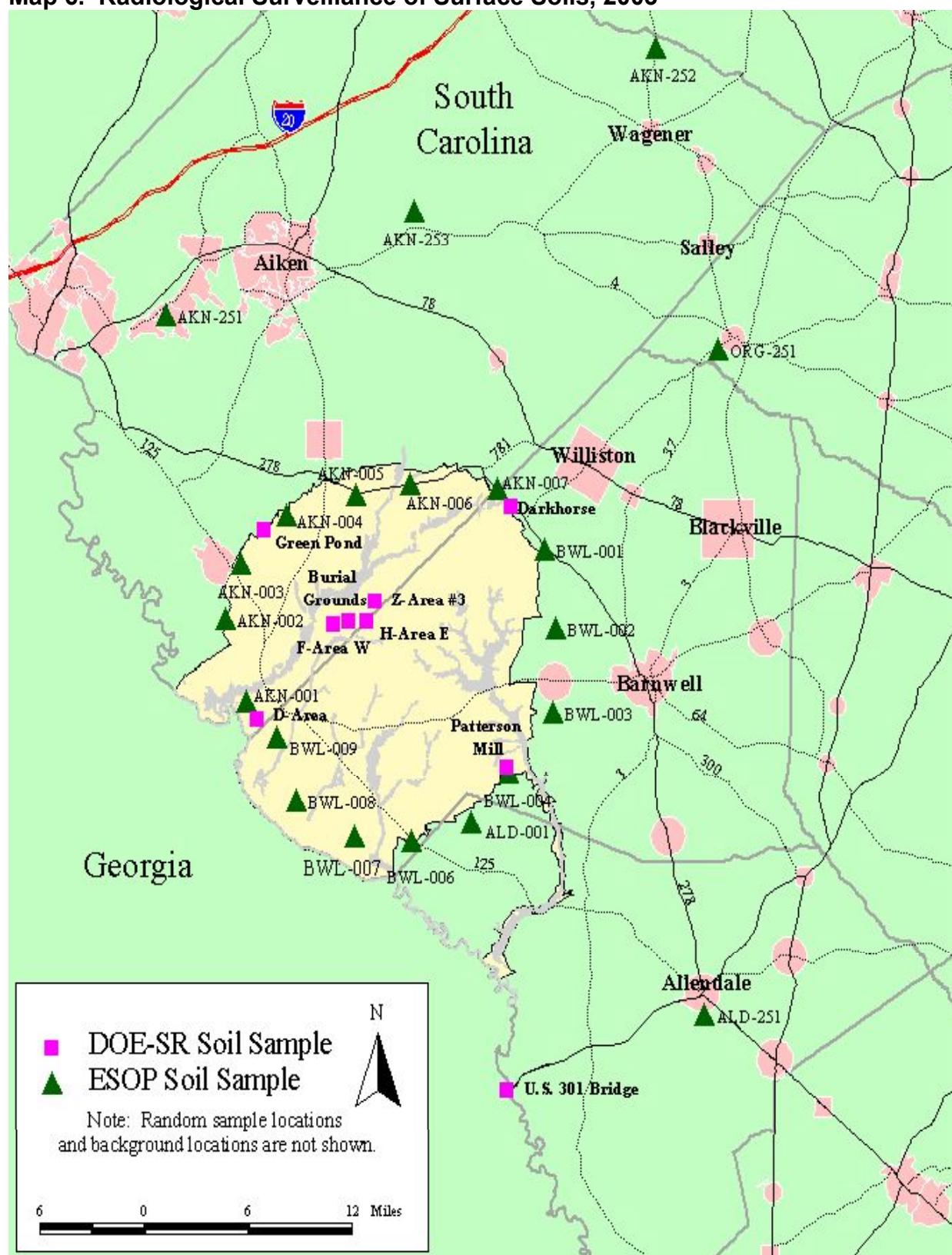
ESOP and SRS split samples and independent soil samples were of the same relative magnitude and within 3 Std. Dev. of the SRS data except for one K-40 detect at the AKN-006 location. Three radioisotopes were within one SD, two within 2 SD, and four out of five were within 3 SD of the DOE-SR average. This variance is believed to be due to the difficulty involved in mixing a soil sample to produce a homogeneous mixture suitable for soil splits. The ESOP Cs-137 SRS inner perimeter results comparisons to DOE-SR inner perimeter results at D-area, Darkhorse,

Greenpond, and Patterson Mill illustrate that two separate organizations can sometimes obtain very similar results in environmental samples (within one standard deviation on average) despite the variability in the media, and the independence of the collectors and locations. The K-40 difference for the soil split at the AKN-006 location illustrates that there can still be complete disagreement for some radioisotopes where homogeneous samples are not achieved due to the nature of the media and the radioisotope sampled. Since there was not any other notable disagreement for all the other radioisotopes, ESOP concludes that the DOE-SR soil analyses are representative of the environment around SRS.

ESOP plans to add random sampling to all media collected, where possible, in order to do probabilistic tests on SRS perimeter and South Carolina background samples. Random sampling along with reduced lab minimum detectable concentrations, and an increase in the number of low energy radionuclides monitored should contribute to soil contaminant characterization accuracy in the near future. The possibility of correlating some random background and perimeter maximums with nuclear fallout radioactive deposition tracks may be achieved at some time in the future.

3.1.2

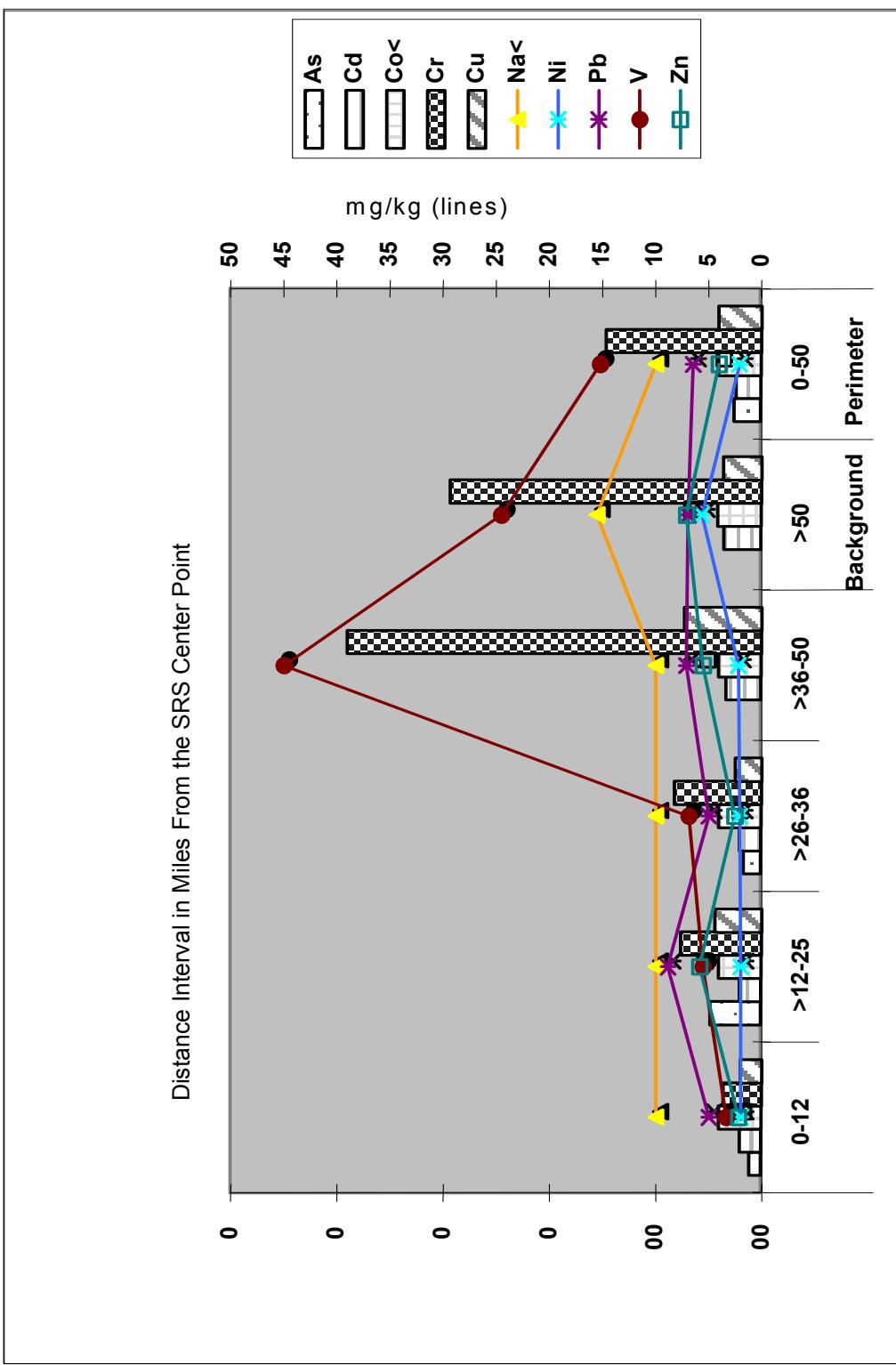
Map 6. Radiological Surveillance of Surface Soils, 2003



3.1.3 Tables and Figures

Radiological Surveillance of Surface Soils, 2003

Figure 1a. ESOP 2001-2003 Distance Interval Soil Median Concentrations of <50 mg/kg at 0-4 ft. (a+b) Depths.

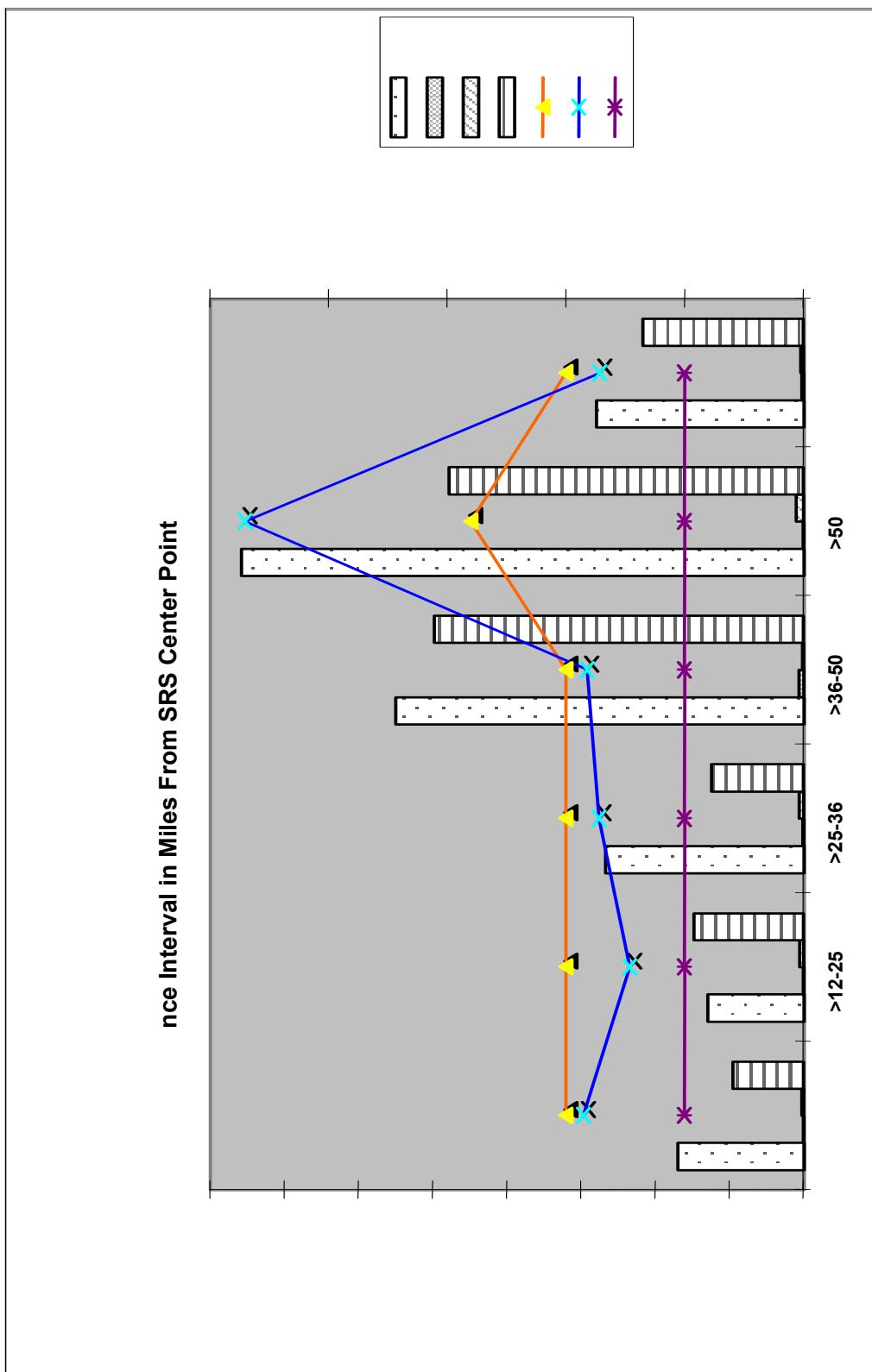


Notes:

- 1 The “<” following an element symbol indicates that most of the data for that element was less than the MDC.
- 2 The mg/kg scale on the left is for the bars and the mg/kg scale on the right is for the lines.
- 3 The “a+b” depth refers to the 0-1 foot soil sample results and 1-4 foot soil sample results averaged together.

Radiological Surveillance of Surface Soils, 2003

Figure 1b. ESOP 2001-2003 Distance Interval Soil Median Concentrations of >50 mg/kg, at 0-4 ft. (a+b depths).

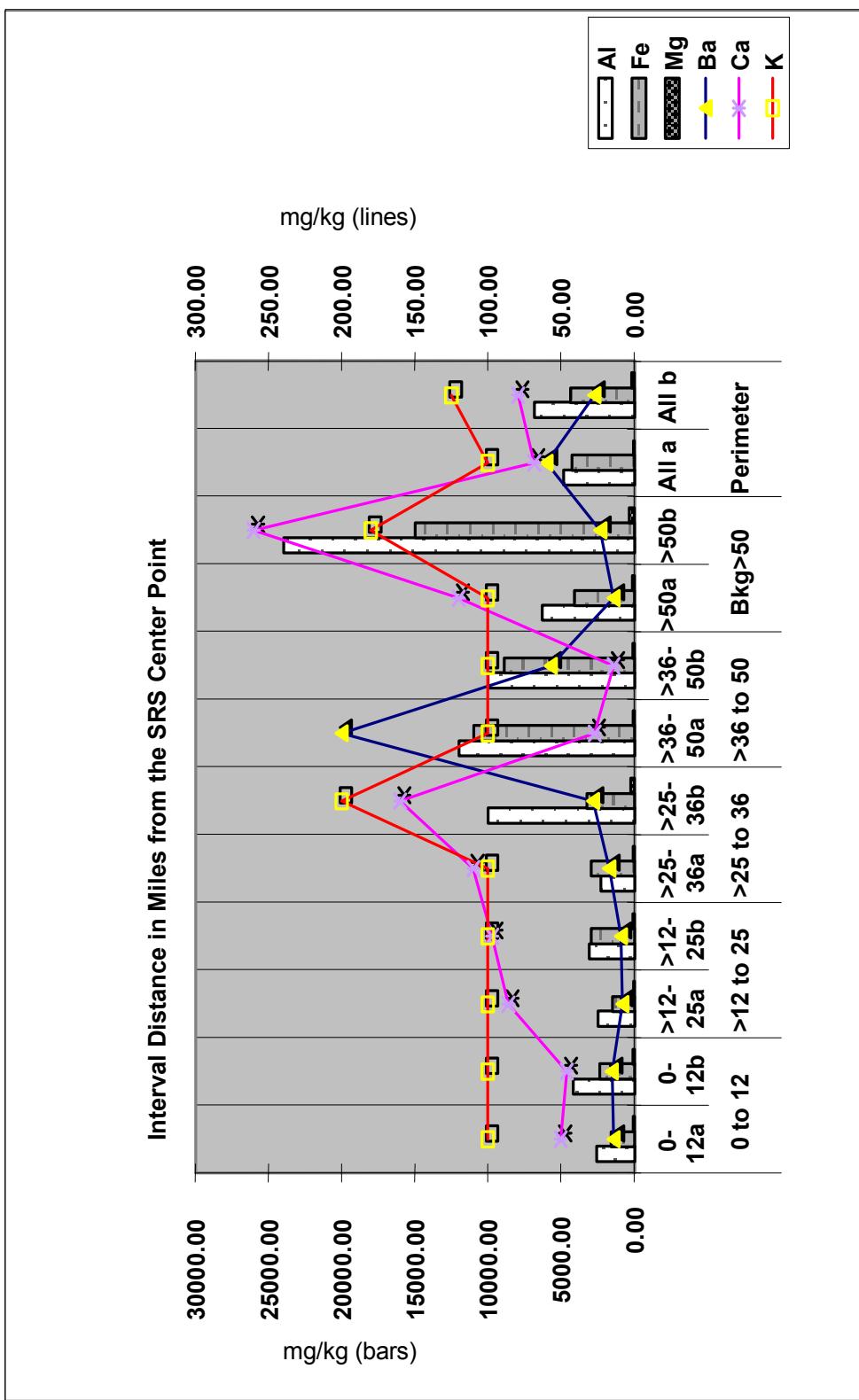


Notes:

1. The “<” following an element symbol indicates that most of the data for that element was less than the MDC.
2. The mg/kg scale on the left is for the bars and the mg/kg scale on the right is for the lines.
3. The “a+b” depth refers to the 0-1 foot soil sample results and 1-4 foot soil sample results averaged together.

Radiological Surveillance of Surface Soils, 2003

Figure 2a. ESOP 2001-2003 Distance Interval Soil Concentrations <50 mg/kg at "a" Depths (0-1) and at "b" Depths (1-4).

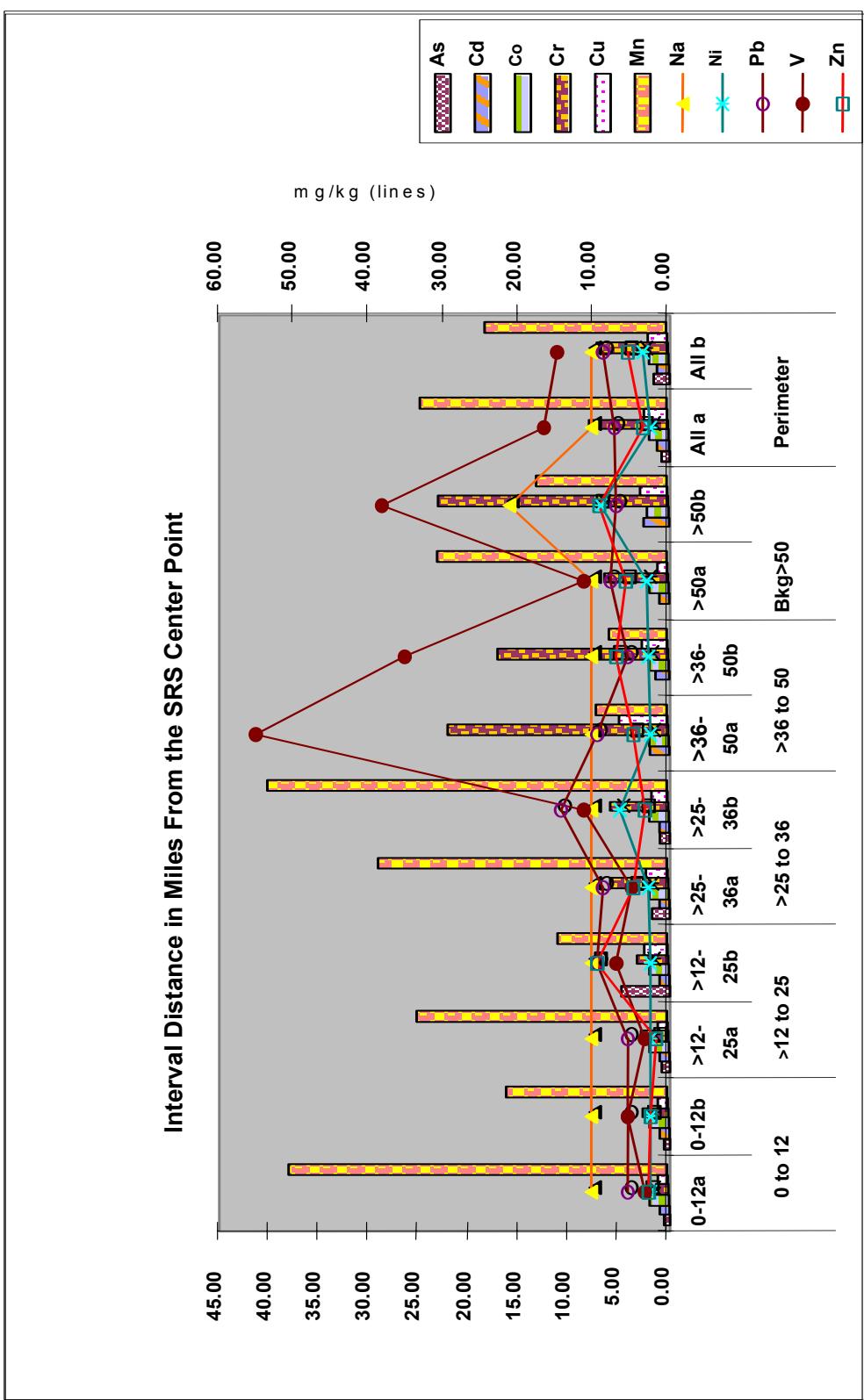


Notes:

- 1 The ">" preceding a mileage is the beginning of a range.
- 2 The mg/kg scale on the left is for the bars and the mg/kg scale on the right is for the lines.
- 3 the "a" following a number refers to the soil sample results at 0-1 feet.
- 4 The "b" following a number refers to the soil sample results at 1-4 feet.
- 5 The "Miles" column refers to all soil sample results within that interval distance from the SRS center point.

Radiological Surveillance of Surface Soils, 2003

Figure 2b. ESOP 2001-2003 Distance Interval Soil Concentrations >50 mg/kg at “a” Depths (0-1ft.) and at “b” Depths (1-4 ft.).



Notes:

1. The “>” preceding a mileage is the beginning of a range.
2. The mg/kg scale on the left is for the bars and the mg/kg scale on the right is for the lines.
3. the “a” following a number refers to the soil sample results at 0-1 foot.
4. The “b” following a number refers to the soil sample results at 1-4 feet.
5. The “Miles” column refers to all soil sample results within that interval distance from the SRS center point.

Radiological Surveillance of Surface Soils, 2003

Table 1. Radioisotopes and Metals Analyzed in Surface Soils on and Adjacent to Savannah River Site.

Radioisotope		Metal	
Name	Abbreviation	Name	Abbreviation
actinium-228	Ac-228	aluminum	Al
americium-241	Am-241	antimony	Sb
antimony-125	Sb-125	arsenic	As
beryllium-7	Be-7	barium	Ba
bismuth-212	Bi-212	beryllium	Be
bismuth-214	Bi-214	cadmium	Cd
cesium-134	Cs-134	calcium	Ca
cesium-137	Cs-137	chromium	Cr
cobalt-58	Co-58	cobalt	Co
cobalt-60	Co-60	copper	Cu
euroium-152	Eu-152	iron	Fe
euroium-154	Eu-154	lead	Pb
euroium-155	Eu-155	magnesium	Mg
iodine-131	I-131	manganese	Mn
lead-212	Pb-212	mercury	Hg
lead-214	Pb-214	nickel	Ni
manganese-54	Mn-54	potassium	K
potassium-40	K-40	selenium	Se
radium-226	Ra-226	silver	Ag
ruthenium-103	Ru-103	sodium	Na
sodium-22	Na-22	thallium	Tl
technetium-99	Tc-99	vanadium	V
thallium-208	Tl-208	zinc	Zn
thorium-234	Th-234		
ytterium-88	Y-88		
zinc-65	Zn-65		
zirconium-95	Zr-95		

Radiological Surveillance of Surface Soils, 2003**Table 2. Surface Soil Sample Locations and Descriptions.**

AKN-001	TNX area, east of pump house #1 & River Rd, access rd. A-4.1 in woods by power lines, 0.55 mi. from rd. A-4.7, ~130 yds. from shed/tank.
AKN-002	At Crackerneck check station off Brown Rd. (S-02-2035) SW of Jackson.
AKN-003	South side of SRS Rd. 1, ~0.6 miles east of SRS Rd. C.
AKN-004	Greenpond Rd, just outside of SRS.
AKN-005	South side of U.S. Hwy. 278, 1.9 miles east of S.C. Hwy. 19/SRS Rd. 2, opposite a green telephone utility box labeled LC.
AKN-006	N. of Hwy. 278, ~0.15 mi. up Boggy Gut Rd., 1.0 mi. east of Upper Three Runs.
AKN-007	West side of S-02-274 ~50 yds. before Barnwell County line.
BWL-001	West side of U.S. Hwy. 278 ~1.7 miles south of Hwy. 39.
BWL-002	West side of road S-06-21 ~ 0.2 miles north of junction with S-06-166.
BWL-003	East side of road S-06-54, ~ 4.55 mi. south of BWL-002..
BWL-004	Behind WSRC air station 614-62G, north side of SRS Rd. A-18/S-06-856.
ALD-001	Off S-06-12, 0.7 miles (at curve) west of S-06-446.
BWL-006	At Barricade 5 on SRS Rd. A/S.C. Hwy. 125.
BWL-007	Off SRS Rd. A-17 at junction with SRS Rd. A-17.2 and A-17 Water Gap Rd.
BWL-008	Off SRS Rd. A-13, ~ 1.7 mi. east of Fourmile Creek opposite Hog Barn.
BWL-009	Off SRS Rd. A-13, 0.7 miles west of junction with power lines.
<u>25-Mile Stations</u>	
AKN-251	Langley, South Carolina, along dirt road off S-02-398.
ORG-251	Springfield, South Carolina, behind ball field on Hwy. 39.
ALD-251	Allendale, South Carolina, 1.25 miles Southwest of Allendale on Road 19.
<u>Random Stations</u>	
AKN-252	Off SSR-110, west and south side of N. Edisto bridge, above Wagener, S. C.
AKN-253	Hwy 4, 0.7 miles past Shaw Ck., on left, short of SSR-262, Couchton, S. C.
<u>Background Stations</u>	
FLO-001	Off I-20, northwest side of Hwy 340 exit, next to field fence, Darlington, S. C.

Radiological Surveillance of Surface Soils, 2003

Table 3. Comparison of Soil Element Average Concentrations By Region of South Carolina.

Element ppm	SRS Perimeter/ESOP			SCDHEC Background Soil Concentration			EPA 10/04	
	2001	2002	2003	ESOP avg.	Coastal Plain	Piedmont	Statewide	PRG '04
Al	4892	6564	6029	5828	5405	24255	13528	7600 0 nc
Sb	<5	<5	<5	<5				3 1 nc
As	<10	1.2	<10	1	2	11	6.1	0.3 9 ca
Ba	20	20	21	20	19	59	38	540 0 nc
Be	0.5	0.4	0.3	0			0.6	15 0 nc
Cd	<1	<1	<1	<1			1	37 nc(1.7 ca)
Ca	122	2186	717	1008			699	
Cr	7	7	6	7	7	29	16	210 ca
Co	6	3	2	4			4	900 ca
Cu	5	3	2	*3	5	13	9	3100 nc
Fe	4404	5359	1955	3906	5271	28467	15608	23000 nc
Pb	16	13	10	13			16	400 nc(150)
Mg	134	1188	437	587	260	1916	988	
Mn	90	76	79	82	22	235	120	1800 nc
Ni	4	3	3	*3	4	9	6	1600 nc
K	236	159	152	182	227	1588	856	
Se	<10	<10	<10	<10			0.9	390 nc
Ag	<3	<3	<3	<3			4	390 nc
Na	41	13	13	22			194	
Tl	<50	<50	<50	<50	11	67	4.5	5.2 nc
V	14	12	11	12				78 nc
Zn	5	11	6	7	14	34	23	23000 nc
Hg	<0.25	<0.25	<0.25	<0.25			0.18	23 nc

Notes:

1. All data averages were rounded off to comparable ppm significant figures.
2. SCDHEC = South Carolina Department of Health and Environmental Control
3. EPA = Environmental Protection Agency
4. PRG = Preliminary Remedial Goals
5. Some of the SCDHEC (Canova study) means are from log normal distributions.
6. The "<" = less than, and refers to a high lab MDC elevating the average on the high side.
7. The "*" indicates many "less than" values decreasing the average on the low side.
8. ca = cancer PRG or carcinogenic level
9. nc = noncancer PRG or toxic level
10. The arsenic 2001 and 2002 averages reflect only the 2002 data from General Engineering Lab since these detects were well below the 2001 reported MDC of < 10 ppm.

3.1.4 Data**Radiological Surveillance of Soils Data, 2003**

Gamma Results	201
Metals	204
Technetium-99	212

Radiological Surveillance of Soils, 2003

Gamma Data

SRS Inner Perimeter								
Location	AKN-001G	AKN-002G	AKN-003G	AKN-004G	AKN-005G	AKN-006G	AKN-007G	ALD-001G
Sample Date	5/29/03	5/13/03	5/29/03	5/30/03	5/29/03	6/11/03	5/20/03	5/30/03
Analyte	pCi/g							
Be-7	<1.137E-01	<2.088E-01	<1.110E-01	<1.783E-01	<1.068E-01	<1.137E-01	<1.254E-01	<1.518E-01
Na-22	<6.305E-03	<9.236E-03	<6.218E-03	<9.225E-03	<5.724E-03	<6.539E-03	<6.064E-03	<7.243E-03
K-40	1.308E+00	1.488E+00	5.092E-01	5.492E-01	4.992E-01	3.698E-01	2.973E-01	4.267E-01
+ / - 2sd	1.372E-01	1.837E-01	9.503E-02	1.348E-01	9.172E-02	7.998E-02	9.140E-02	1.008E-01
MDA	5.658E-02	7.920E-02	5.462E-02	8.299E-02	5.588E-02	6.001E-02	5.642E-02	6.057E-02
Mn-54	<7.380E-03	<1.064E-02	<7.252E-03	<1.024E-02	<6.720E-03	1.579E-02	<7.487E-03	<8.632E-03
+ / - 2sd						5.737E-03		
MDA						7.182E-03		
Co-58	<9.297E-03	<1.639E-02	<9.733E-03	<1.456E-02	<9.991E-03	<9.493E-03	<1.017E-02	<1.182E-02
Co-60	<5.981E-03	<8.666E-03	<6.465E-03	<8.671E-03	<5.689E-03	<6.626E-03	<5.760E-03	<6.554E-03
Zn-65	<1.140E-02	<2.064E-02	<1.449E-02	<1.981E-02	<1.332E-02	<1.532E-02	<1.427E-02	<1.753E-02
Y-88	<7.692E-03	<1.100E-02	<8.025E-03	<1.024E-02	<7.132E-03	<7.780E-03	<8.995E-03	<8.710E-03
Zr-95	<2.070E-02	<3.69E-02	<2.111E-02	<3.006E-02	<2.116E-02	<2.224E-02	<2.124E-02	<2.709E-02
Ru-103	<1.662E-02	<3.165E-02	<1.714E-02	<2.396E-02	<1.589E-02	<1.484E-02	<1.900E-02	<2.350E-02
Sb-125	<2.135E-02	<3.028E-02	<2.084E-02	<3.088E-02	<1.869E-02	<2.336E-02	<1.980E-02	<2.285E-02
I-131	<6.754E-01	>8hle	<7.458E-01	<1.112E+00	<7.511E-01	<3.341E-01	>8hle	>8hle
Cs-134	<6.966E-03	<9.837E-03	<6.994E-03	<9.773E-03	<6.255E-03	<7.420E-03	<6.543E-03	<7.874E-03
Cs-137	1.859E-01	2.760E-01	1.158E-01	3.501E-01	2.083E-02	1.271E-01	4.190E-02	2.860E-01
+ / - 2sd	2.111E-02	3.124E-02	1.648E-02	3.882E-02	6.832E-03	1.569E-02	7.798E-03	3.190E-02
MDA	6.809E-03	9.894E-03	7.459E-03	1.018E-02	6.757E-03	7.667E-03	6.964E-03	8.745E-03
Ce-144	<6.603E-02	<1.005E-01	<6.503E-02	<9.511E-02	<6.267E-02	<7.611E-02	<6.377E-02	<7.880E-02
+ / - 2sd								
MDA								
Eu-152	<2.190E-02	<3.272E-02	<2.197E-02	<3.191E-02	<2.032E-02	<2.476E-02	<2.005E-02	<2.390E-02
Eu-154	<1.596E-02	<2.329E-02	<1.552E-02	<2.269E-02	<1.405E-02	<1.805E-02	<1.430E-02	<1.779E-02
Eu-155	1.151E-01	2.029E-01	1.071E-01	<3.918E-02	8.514E-02	1.801E-01	<3.026E-02	1.692E-01
+ / - 2sd	2.597E-02	3.542E-02	2.541E-02		2.145E-02	3.073E-02		3.129E-02
MDA	2.840E-02	3.958E-02	2.631E-02		2.528E-02	3.260E-02		3.104E-02
Pb-212	<1.418E-02	9.405E-01	<1.363E-02	5.292E-01	3.313E-01	7.277E-01	<1.299E-02	6.125E-01
+ / - 2sd		8.063E-02		4.883E-02	1.614E-01	6.222E-02		5.334E-02
MDA		2.065E-02		2.051E-02	1.286E-02	1.605E-02		1.633E-02
Pb-214	3.400E-01	5.956E-01	3.341E-01	4.654E-01	2.764E-01	5.416E-01	2.287E-01	4.407E-01
+ / - 2sd	2.507E-02	3.888E-02	2.357E-02	3.251E-02	2.027E-02	3.398E-02	1.958E-02	2.928E-02
MDA	1.546E-02	2.130E-02	1.512E-02	2.227E-02	1.388E-02	1.678E-02	1.415E-02	1.630E-02
Ra-226	5.948E-01	1.224E+00	5.582E-01	8.768E-01	5.975E-01	1.153E+00	6.603E-01	1.064E+00
+ / - 2sd	1.826E-01	2.811E-01	1.904E-01	2.598E-01	1.397E-01	2.834E-01	2.061E-01	2.587E+00
MDA	1.816E-01	2.699E-01	1.835E-01	2.658E-01	1.606E-01	2.153E-01	1.637E-01	2.004E-01
Ac-228	4.157E-01	1.022E+00	3.625E-01	5.400E-01	3.581E-01	7.891E-01	2.453E-01	6.265E-01
+ / - 2sd	3.180E-02	5.949E-02	3.089E-02	4.210E-02	2.824E-02	4.699E-02	2.462E-02	4.055E-02
MDA	2.336E-02	3.261E-02	2.323E-02	3.397E-02	2.216E-02	2.591E-02	2.388E-02	2.385E-02
Th-234	<1.549E-01	<2.144E-01	<1.434E-01	6.837E-01	<1.377E-01	<1.786E-01	<1.808E-01	<1.684E-01
+ / - 2sd				2.505E-01				
MDA				2.136E-01				
Am-241	<4.901E-02	<7.409E-02	<4.834E-02	<7.137E-02	<4.598E-02	<5.821E-02	4.470E-02	<5.632E-02

Radiological Surveillance of Soils, 2003

Gamma Data

SRS Inner Perimeter								
Location	BWL-001G	BWL-002G	BWL-003G	BWL-004G	BWL-006G	BWL-007G	BWL-008G	BWL-009G
Sample Date	5/13/03	5/20/03	6/27/03	6/5/03	6/5/03	6/4/03	6/4/03	6/4/03
Analyte	pCi/g							
Be-7	<1.493E-01	<1.497E-01	<1.066E-01	<1.129E-01	<1.056E-01	<1.417E-01	<1.153E-01	<1.500E-01
Na-22	<7.335E-03	<7.216E-03	<8.027E-03	<6.091E-03	<5.465E-03	<6.410E-03	<7.772E-03	<8.754E-03
K-40	2.275E-01	7.344E-01	1.158E+00	4.169E-01	4.825E-01	1.167E+00	3.930E+00	3.585E+00
+ / - 2sd	8.651E-02	1.101E-01	1.519E-01	8.806E-02	8.955E-02	1.234E-01	2.893E-01	2.733E-01
MDA	5.733E-02	6.346E-02	6.874E-02	5.688E-02	5.009E-02	6.162E-02	5.336E-02	6.244E-02
Mn-54	<7.939E-03	<8.432E-03	<9.668E-03	<7.348E-03	<6.565E-03	1.616E-02	<7.568E-03	<9.193E-03
+ / - 2sd						7.056E-03		
MDA						6.940E-03		
Co-58	<1.244E-02	<1.250E-02	<9.172E-03	<9.248E-03	<8.544E-03	<1.127E-02	<1.010E-02	<1.249E-02
Co-60	<6.970E-03	<7.046E-03	<7.046E-03	<5.945E-03	<5.807E-03	<6.922E-03	<6.838E-03	<7.626E-03
Zn-65	<1.675E-02	<1.685E-02	<1.700E-02	<1.460E-02	<1.299E-02	<1.560E-02	<1.800E-02	<2.030E-02
Y-88	<9.525E-03	<8.668E-03	<7.725E-03	<8.151E-03	<6.330E-03	<7.749E-03	<7.650E-03	<9.367E-03
Zr-95	<2.801E-02	<2.509E-02	<2.046E-02	<2.020E-02	<1.821E-02	<2.414E-02	<2.157E-02	<2.772E-02
Ru-103	<2.413E-02	<2.268E-02	<1.359E-02	<1.700E-02	<1.523E-02	<1.893E-02	<1.685E-02	<2.107E-02
Sb-125	<2.154E-02	<2.243E-02	<2.517E-02	<2.158E-02	<1.984E-02	<2.197E-02	<1.926E-02	<2.614E-02
I-131	>8hle	>8hle	<1.306E-01	<7.740E-01	<6.878E-01	<1.001E+00	<9.049E-01	<1.226E+00
Cs-134	<7.715E-03	<7.476E-03	<8.462E-03	<6.984E-03	<6.367E-01	<7.565E-03	<6.711E-03	<8.391E-03
Cs-137	1.493E-01	9.913E-02	3.475E-01	2.102E-01	2.116E-01	2.566E-01	5.349E-02	2.896E-01
+ / - 2sd	1.969E-02	1.300E-02	3.901E-02	2.430E-02	2.403E-02	2.823E-02	1.004E-02	3.301E-02
MDA	7.645E-03	7.530E-03	9.078E-03	7.375E-03	6.532E-03	7.618E-03	8.193E-03	8.430E-03
Ce-144	<7.428E-02	<7.711E-02	<7.756E-02	<6.906E-02	<5.732E-02	<7.719E-02	<6.359E-02	<8.295E-02
+ / - 2sd								
MDA								
Eu-152	<2.283E-02	<2.446E-02	<2.775E-02	<2.219E-02	<1.871E-02	<2.400E-02	<2.095E-02	<2.835E-02
Eu-154	<1.659E-02	<1.754E-02	<1.951E-02	<1.610E-02	<1.310E-02	<1.823E-02	<1.471E-02	<2.053E-02
Eu-155	<2.684E-02	<3.011E-02	1.504E-01	1.277E-01	<2.594E-02	1.401E-01	<3.055E-02	1.892E-01
+ / - 2sd			3.737E-02	2.517E-02		2.685E-02		3.277E-02
MDA			3.365E-02	2.815E-02		3.207E-02		3.417E-02
Pb-212	<1.461E-02	5.422E-01	4.770E-01	3.831E-01	<1.210E-02	6.364E-01	3.655E-01	6.576E-01
+ / - 2sd		4.754E-02	2.225E-01	1.742E-01		5.501E-02	1.821E-01	5.715E-02
MDA		1.482E-02	1.732E-02	1.404E-02		1.626E-02	1.297E-02	1.765E-02
Pb-214	3.211E-01	4.810E-01	4.829E-01	3.780E-01	1.980E-01	4.361E-01	2.681E-01	6.494E-01
+ / - 2sd	2.437E-02	3.233E-02	3.116E-02	2.625E-02	1.693E-02	3.060E-02	1.986E-02	3.628E-02
MDA	1.575E-02	1.626E-02	1.867E-02	1.541E-02	1.299E-02	1.622E-02	1.454E-02	1.880E-02
Ra-226	6.787E-01	9.352E-01	9.142E-01	8.078E-01	3.507E-01	8.438E-01	5.544E-01	1.445E+00
+ / - 2sd	2.005E-01	2.002E-01	2.758E-01	1.706E-01	1.632E-01	2.325E-01	1.674E-01	2.542E-01
MDA	1.897E-01	2.021E-01	2.257E-01	1.872E-01	1.575E-01	2.066E-01	1.670E-01	2.312E-01
Ac-228	4.157E-01	5.864E-01	5.683E-01	5.313E-01	2.459E-01	6.836E-01	2.988E-01	7.276E-01
+ / - 2sd	3.363E-02	4.052E-02	4.136E-02	3.677E-02	2.394E-02	4.170E-02	2.561E-02	4.521E-01
MDA	2.411E-02	2.060E-02	2.654E-02	2.491E-02	2.097E-02	2.401E-02	2.215E-02	2.655E-02
Th-234	4.324E-01	7.029E-01	<1.851E-01	<1.535E-01	<1.206E-01	<1.746E-01	<1.309E-01	<1.860E-01
+ / - 2sd	1.537E-01	2.051E-01						
MDA	1.452E-01	1.632E-01						
Am-241	<5.121E-02	<5.404E-02	<6.134E-02	<5.149E-02	<4.071E-02	<5.577E-02	<4.529E-02	<6.405E-02

Radiological Surveillance of Soils, 2003

Gamma Data

Gamma Scan	Outer Perimeter					Background
Location	AKN-251G	AKN-252G	AKN-253G	ALD-251G	ORG-251G	FLO-001G
Sample Date	6/11/03	6/19/03	6/23/03	6/19/03	6/19/03	6/24/03
Analyte	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Be-7	<2.383E-01	<1.478E-01	<2.332E-01	<1.384E-01	<1.680E-01	<1.783E-01
Na-22	<1.469E-02	<1.012E-02	<1.640E-02	<9.994E-03	1.168E-02	<1.156E-02
K-40	4.796E-01	3.005E-01	6.120E-01	2.635E-01	6.725E-01	3.548E-01
+ or - 2sd	1.686E-01	1.127E-01	1.843E-01	1.137E-01	1.372E-01	1.500E-01
MDA	1.319E-01	9.342E-02	1.434E-01	1.012E-01	1.074E-01	1.148E-01
Mn-54	<1.615E-02	<1.219E-02	<1.664E-02	<1.119E-02	<1.245E-02	<1.374E-02
Co-58	<2.22E-02	<1.467E-02	<2.294E-02	<1.425E-02	<1.695E-02	<1.732E-02
Co-60	<1.374E-02	<1.001E-02	<1.574E-02	<1.026E-02	<1.172E-02	<1.154E-02
Zn-65	<3.970E-02	<2.851E-02	<4.072E-02	<2.450E-02	<3.043E-02	<3.089E-02
Y-88	<1.959E-02	<1.199E-02	<1.565E-02	<1.083E-02	<1.302E-02	<1.335E-02
Zr-95	<4.523E-02	<2.874E-02	<4.869E-02	<2.677E-02	<3.574E-02	<3.438E-02
Ru-103	<3.436E-02	<1.987E-02	<3.153E-02	<1.919E-02	<2.331E-02	<2.339E-02
Sb-125	<4.369E-02	<3.071E-02	<5.008E-02	<2.969E-02	<3.629E-02	<3.670E-02
I-131	<9.913E-01	<3.748E-01	<4.497E-01	<3.367E-01	<3.746E-01	<4.106E-01
Cs-134	<1.884E-02	<1.266E-02	<2.103E-02	<1.151E-02	<1.503E-02	<1.475E-02
Cs-137	1.633E-01	1.237E-01	2.929E-01	9.135E-02	8.882E-02	1.737E-01
+ or - 2sd	2.240E-02	1.552E-02	3.099E-02	1.652E-02	1.889E-02	2.330E-02
MDA	1.624E-02	1.124E-02	1.880E-02	1.146E-02	1.437E-02	1.319E-02
Ce-144	2.649E-01	<7.942E-02	<1.322E-01	<6.469E-02	<9.412E-02	<9.389E-02
+ or - 2sd	1.297E-01					
MDA	1.097E-01					
Eu-152	<3.572E-02	<2.584E-02	<4.313E-02	<2.094E-02	<3.122E-02	<3.040E-02
Eu-154	<2.527E-02	<1.832E-02	<3.055E-02	<1.503E-02	<2.204E-02	<2.159E-02
Eu-155	<4.702E-02	<3.166E-02	<5.665E-02	<2.470E-02	<2.892E-02	1.970E-01
+ or - 2sd						4.204E-02
MDA						2.908E-02
Pb-212	9.069E-01	5.055E-01	6.597E-01	<9.888E-03	7.425E-01	5.842E-01
+ or - 2sd	4.406E-01	2.268E-01	5.424E-02		7.432E-02	2.759E-01
MDA	1.675E-02	1.206E-02	2.041E-02		1.460E-02	1.304E-02
Pb-214	5.600E-01	4.318E-01	8.120E-01	1.559E-01	5.560E-01	5.043E-01
+ or - 2sd	4.391E-02	3.132E-02	5.774E-02	2.101E-02	3.941E-02	3.857E-02
MDA	4.709E-02	2.172E-02	3.623E-02	1.945E-02	2.449E-02	2.475E-02
Ra-226	1.319E+00	8.945E-01	2.227E+00	5.595E-01	1.455E+00	1.191E+00
+ or - 2sd	3.938E-01	2.718E-01	5.084E-01	1.941E-01	3.610E-01	3.251E-01
MDA	3.301E-01	2.309E-01	3.875E-01	2.024E-01	2.770E-01	2.733E-01
Ac-228	8.745E-01	4.187E-01	1.477E+00	1.729E-01	7.174E-01	6.543E-01
+ or - 2sd	6.681E-02	3.709E-02	8.853E-02	3.052E-02	5.126E-02	5.428E-02
MDA	5.688E-02	4.107E-02	6.099E-02	3.925E-02	4.483E-02	3.632E-02
Th-234	8.497E-01	<1.619E-01	<2.431E-01	<1.230E-01	5.626E-01	<1.729E-01
+ or - 2sd	2.579E-01				1.943E-01	
MDA	2.099E-01				1.720E-01	
Am-241	<3.453E-02	<2.380E-02	<4.090E-02	<2.007E-02	<2.913E-02	2.903E-02

Radiological Surveillance of Soils, 2003
Metals Data

SRS Perimeter Sample Locations						
Location	AKN-001Ma	AKN-001Mb	AKN-002Ma	AKN-002Mb	AKN-003Ma	AKN-003Mb
Sample Date	5/29/2003	5/29/2003	5/13/2003	5/13/2003	5/29/2003	5/29/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	5000	6900	6400	2900	2900	3,400
Antimony	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	45	23	32	13	10	22
Beryllium	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	110	170	72	54	30	80
Chromium	1.2	2.9	2	<1.0	<1.0	1.1
Cobalt	2.2	<2.0	<2.0	<2.0	<2.0	<2.0
Copper	1.9	1.8	2.4	<1.0	<1.0	1.4
Iron	3600	5800	3000	1600	620	1000
Lead	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Magnesium	110	140	180	79	60	93
Manganese	460	100	99	32	24	45
Nickel	2.5	3	2.9	<2.0	<2.0	<2.0
Potassium	240	340	260	100	<100	110
Selenium	<10	<10	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	<10	<10	<10	<10
Thallium	<50	<50	<50	<50	<50	<50
Vanadium	8.7	14	6.1	3	<2.0	2.4
Zinc	6	7	5.9	2.2	2.2	2.6
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Radiological Surveillance of Soils, 2003
Metals Data

SRS Perimeter Sample Locations						
Location	AKN-004Ma	AKN-004Mb	AKN-005Ma	AKN-005Mb	AKN-006Ma	AKN-006Mb
Sample Date	5/30/2003	5/30/2003	5/29/2003	5/29/2003	6/11/2003	6/11/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	3800	8600	2,100	7,200	2,100	<3.0
Antimony	<5.0	<5.0	<5	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	17	28	7.9	25	15	7.6
Beryllium	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0	<10
Calcium	50	73	21	47	40	13
Chromium	1.6	4.7	<1.0	3.4	<1.0	<1
Cobalt	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Copper	1.1	1.7	<1.0	1	<1.0	<1.0
Iron	1300	3600	430	3700	340	420
Lead	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Magnesium	80	140	52	220	51	42
Manganese	110	17	9	100	62	72
Nickel	<2.0	2.4	<2.0	2.3	<2.0	<2.0
Potassium	120	210	<100	290	<100	<100
Selenium	<10	<10	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	<10	<10	<10	<10
Thallium	<50	<50	<50	<50	<50	<50
Vanadium	3.5	9.6	<2.0	9.2	<2.0	<2.0
Zinc	3.3	3.4	1.5	4.8	1.9	<1.0
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Radiological Surveillance of Soils, 2003
Metals Data

SRS Perimeter Sample Locations						
Location	AKN-007Ma	AKN-007Mb	ALD-001Ma	ALD-001Mb	BWL-001Ma	BWL-001Mb
Sample Date	5/20/2003	5/20/2003	5/30/2003	5/30/2003	5/13/2003	5/13/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	5,100	3,900	2,000	3400	1,800	6,400
Antimony	<5.0	<5.0	<5	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	19	6.6	<5	<5.0	<5.0	21
Beryllium	<0.30	<0.30	<0	<0.30	<0.30	<0.30
Cadmium	<1.0	<1.0	.30	<1.0	<1.0	<1.0
Calcium	110	16	20	20	20	42
Chromium	2.1	<1.0	<1.0	2.4	3.7	2.3
Cobalt	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Copper	1.5	<1.0	<1.0	<1.0	<1.0	<1.0
Iron	3500	1,900	1100	2,300	910	1,900
Lead	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Magnesium	140	96	23	64	29	82
Manganese	24	14	<1.0	<1.0	20	9.6
Nickel	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Potassium	180	<100	<100	<100	<100	100
Selenium	<10	<10	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	<10	<10	<10	<10
Thallium	<50	<50	<50	<50	<50	<50
Vanadium	10	3.9	3.9	8.1	2	6.5
Zinc	5.2	3.5	3.9	<1.0	1.8	1.9
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Radiological Surveillance of Soils, 2003
Metals Data

SRS Perimeter Sample Locations						
Location	BWL-002Ma	BWL-002Mb	BWL-003Ma	BWL-003Mb	BWL-004Ma	BWL-004Mb
Sample Date	5/20/2003	5/20/2003	6/27/2003	6/27/2003	6/5/2003	6/5/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	4,500	19,000	3,400	1,900	4,200	15,000
Antimony	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	31	46	16	6.8	14	17
Beryllium	<0.30	0.32	<0.30	<0.30	<0.30	<0.30
Cadmium	<1.0	1.7	<1.0	<1.0	<1.0	2.2
Calcium	57	220	140	46	63	100
Chromium	<1.0	7.7	1.3	2.4	1.2	12
Cobalt	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Copper	1.1	3.7	1	1.2	<1.0	1.5
Iron	1100	8100	900	200	1,400	11,000
Lead	<5.0	6.6	7.8	<5.0	<5.0	<5.0
Magnesium	87	270	110	62	75	180
Manganese	190	69	62	8.6	55	12
Nickel	<2.0	4.8	2.2	3.8	<2.0	3.6
Potassium	120	570	<100	<100	<100	260
Selenium	<10	<10	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	<10	<10	<10	<10
Thallium	<50	<50	<50	<50	<50	<50
Vanadium	3.2	26	<2.0	<2.0	3.9	32
Zinc	1.8	6.1	3.1	1.6	1.8	5.4
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Radiological Surveillance of Soils, 2003
Metals Data

SRS Outer Perimeter Sample Locations						
Location	BWL-006Ma	BWL-006Mb	BWL-007a	BWL-007b	BWL-008a	BWL-008b
Sample Date	6/5/2003	6/5/2003	6/4/2003	6/4/2003	6/4/2003	6/4/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	5,200	5,800	2,500	9,000	4,800	5,600
Antimony	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	22	15	20	42	56	42
Beryllium	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	380	85	47	180	160	100
Chromium	2.1	4.6	<1.0	4.3	1.7	2.2
Cobalt	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Copper	1.6	1.2	<1.0	<1.0	2.1	1.8
Iron	1,900	3,700	530	4,200	1,700	2,400
Lead	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Magnesium	300	180	70	290	160	210
Manganese	120	42	150	22	560	210
Nickel	3	2.2	<2.0	3.1	2	2.1
Potassium	<100	140	<100	360	180	320
Selenium	<10	<10	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	<10	<10	<10	<10
Thallium	<50	<50	<50	<50	<50	<50
Vanadium	4.1	7.4	<1.0	12	2.7	5.2
Zinc	5.1.	4.3	2.5	5.4	7.4	8.4
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Radiological Surveillance of Soils, 2003
Metals Data

SRS Outer Perimeter Sample Locations					Background Location	
Location	BWL-009a	BWL-009b	AKN-251Ma	AKN-251Mb	ALD-251Ma	ALD-251Mb
Sample Date	6/4/2003	6/4/2003	6/11/2003	6/11/2003	6/19/2003	6/19/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	5,700	7,000	2,900	3,100	1,800	1,200
Antimony	5	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	15	39	20	8.9	10	<5.0
Beryllium	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium	<1.0	4.3	<1.0	<1.0	<1.0	<1.0
Calcium	30	76	530	140	82	7.7
Chromium	7	19	3.9	3.7	8.7	<1.0
Cobalt	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Copper	1.1	5.8	2.1	2.3	2.4	<1.0
Iron	4,400	16,000	1,400	1,800	360	<2.0
Lead	<5.0	8.7	18	<5.0	<5.0	<5.0
Magnesium	82	280	66	35	44	23
Manganese	39	13	29	1.6	37	6
Nickel	<2.0	4.2	3	<2.0	9	<2.0
Potassium	160	450	<100	<100	<100	<100
Selenium	<10	<10	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	<10	<10	<10	14
Thallium	<50	<50	<50	<50	<50	<50
Vanadium	13	55	4.5	6.6	<2.0	<2.0
Zinc	5.7	12	28	9.1	4.3	3.9
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

Radiological Surveillance of Soils, 2003
Metals Data

SRS Outer Perimeter Sample Locations				
Location	ORG-251Ma	ORG-251Mb	AKN-252Ma	AKN-252Mb
Sample Date	6/19/2003	6/19/2003	6/19/2003	6/19/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	5,200	10,000	12000	10000
Antimony	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10
Barium	24	28	200	57
Beryllium	<0.30	<0.30	<0.30	<0.30
Cadmium	<1.0	<1.0	1.9	1.4
Calcium	130	160	27	14
Chromium	2.9	5.8	22	17
Cobalt	<2.0	<2.0	<2.0	<2.0
Copper	<1.0	1.6	4.8	2.5
Iron	1,800	3,800	11000	8900
Lead	<5.0	<5.0	9.2	<5.0
Magnesium	99	240	82	100
Manganese	93	24	7.1	5.8
Nickel	2	<10	2.1	2.3
Potassium	<100	300	<100	<100
Selenium	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	<10	<10
Thallium	<50	<50	<50	<50
Vanadium	5.3	11	55	35
Zinc	3.8	5.3	4.4	6.7
Mercury	<0.25	<0.25	<0.25	<0.25

Radiological Surveillance of Soils, 2003
Metals Data

SRS Outer Perimeter Sample Locations				
Location	AKN-253Ma	AKN-253Mb	FLO-001Ma	FLO-001Mb
Sample Date	6/23/2003	6/23/2003	6/24/2003	6/24/2003
Analyte	mg/kg	mg/kg	mg/kg	mg/kg
Aluminum	14000	37000	6300	24000
Antimony	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10
Barium	17	18	14	23
Beryllium	<0.30	<0.30	<0.30	<0.30
Cadmium	1.3	2.9	<1.0	2.5
Calcium	110	97	120	260
Chromium	13	30	6.3	23
Cobalt	<2.0	<2.0	<2.0	2.1
Copper	3.2	3.8	<1.0	2.6
Iron	7100	16000	4100	15000
Lead	13	9.3	7.3	6.6
Magnesium	130	140	130	340
Manganese	31	11	23	13
Nickel	4.2	5.2	2.5	8.8
Potassium	<100	<100	<100	180
Selenium	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0
Sodium	13	15	<10	21
Thallium	<50	<50	<50	<50
Vanadium	22	49	11	38
Zinc	17	11	5.3	8.9
Mercury	<0.25	<0.25	<0.25	<0.25

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Technetium-99

Location	Result	Uncertainty	M D A
A K N - 0 0 1	< M D A	1 . 0 0 E + 0 0	1 . 5 6 E + 0 0
A K N - 0 0 2	< M D A	1 . 1 0 E + 0 0	1 . 5 5 E + 0 0
A K N - 0 0 3	< M D A	9 . 8 0 E - 0 1	1 . 5 6 E + 0 0
A K N - 0 0 4	5 . 1 6 E + 0 0	1 . 3 0 E + 0 0	1 . 5 7 E + 0 0
A K N - 0 0 5	< M D A	1 . 0 0 E + 0 0	1 . 5 6 E + 0 0
A K N - 0 0 6	< M D A	1 . 0 0 E + 0 0	1 . 5 4 E + 0 0
A K N - 0 0 7	< M D A	1 . 0 0 E + 0 0	1 . 5 7 E + 0 0
B W L - 0 0 1	< M D A	1 . 0 0 E + 0 0	1 . 5 7 E + 0 0
B W L - 0 0 2	< M D A	1 . 0 0 E + 0 0	1 . 5 6 E + 0 0
B W L - 0 0 3	< M D A	1 . 0 0 E + 0 0	1 . 5 6 E + 0 0
B W L - 0 0 4	< M D A	1 . 0 0 E + 0 0	1 . 5 6 E + 0 0
B W L - 0 0 6	< M D A	1 . 1 0 E + 0 0	1 . 5 5 E + 0 0
B W L - 0 0 7	< M D A	1 . 1 0 E + 0 0	1 . 5 7 E + 0 0
B W L - 0 0 8	< M D A	1 . 0 0 E + 0 0	1 . 5 6 E + 0 0
B W L - 0 0 9	< M D A	1 . 0 0 E + 0 0	1 . 5 5 E + 0 0
A L D - 0 0 1	< M D A	1 . 0 0 E + 0 0	1 . 5 4 E + 0 0
A K N - 2 5 1	< M D A	1 . 0 0 E + 0 0	1 . 5 5 E + 0 0
A K N - 2 5 2	< M D A	1 . 0 0 E + 0 0	1 . 5 3 E + 0 0
A K N - 2 5 3	< M D A	1 . 0 0 E + 0 0	1 . 5 4 E + 0 0
A L D - 2 5 1	< M D A	1 . 0 0 E + 0 0	1 . 5 5 E + 0 0
O R G - 2 5 1	< M D A	1 . 0 0 E + 0 0	1 . 5 4 E + 0 0
D u p # 1	< M D A	1 . 0 0 E + 0 0	1 . 5 5 E + 0 0
D u p # 2	< M D A	1 . 0 0 E + 0 0	1 . 5 4 E + 0 0
D u p # 3	< M D A	1 . 0 0 E + 0 0	1 . 5 4 E + 0 0
D u p # 4	< M D A	1 . 0 0 E + 0 0	1 . 5 5 E + 0 0
F L O - 0 0 1	< M D A	1 . 0 0 E + 0 0	1 . 5 4 E + 0 0
R B A	9 . 6 3 E + 0 1		

3.1.5 Summary Statistics

Radiological Surveillance Of Surface Soils, 2003

Gamma Summary Statistics

Analyte	Average	Std. Dev.	Median	Minimum	Maximum	Coef.Var.	Bkg Avg
Be-7	0.000	0.000	0.000	0.000	0.000		0.178
Na-22	0.000	0.000	0.000	0.000	0.000		0.012
K-40	0.927	1.007	0.509	0.228	3.930	1.086	0.355
Mn-54	0.016	0.015	0.015	0.015	0.015	0.953	0.014
Co-58	0.000	0.000	0.000	0.000	0.000		0.017
Co-60	0.000	0.000	0.000	0.000	0.000		0.012
Zn-65	0.000	0.000	0.000	0.000	0.000		0.031
Y-88	0.000	0.000	0.000	0.000	0.000		0.013
Zr-95	0.000	0.000	0.000	0.000	0.000		0.034
Ru-103	0.000	0.000	0.000	0.000	0.000		0.023
Sb-125	0.000	0.000	0.000	0.000	0.000		0.037
I-131	0.679	0.320	0.717	0.131	1.226	0.470	0.411
Cs-134	0.000	0.000	0.000	0.000	0.000		0.015
Cs-137	0.180	0.101	0.163	0.021	0.350	0.562	0.174
Ce-144	0.265		0.265	0.265	0.265		0.094
Eu-152	0.000	0.000	0.000	0.000	0.000		0.030
Eu-154	0.000	0.000	0.000	0.000	0.000		0.022
Eu-155	0.147	0.039	0.145	0.085	0.203	0.263	0.197
Pb-212	0.601	0.182	0.613	0.331	0.941	0.302	0.584
Pb-214	0.031	0.004	0.032	0.025	0.040	0.137	0.504
Ra-226	0.939	0.428	0.877	0.351	2.227	0.456	1.191
Ac-228	0.575	0.303	0.540	0.173	1.477	0.526	0.654
Th-234	0.646	0.157	0.684	0.432	0.850	0.243	0.173
Am-241	0.000	0.000	0.000	0.000	0.000		0.029

Notes:

1. There was only one background location. Thus, the average and median are the same.

Summary Statistics
Radiological Surveillance Of Surface Soils, 2003
Target Analyte List

Analyte	Average	Std. Dev.	Median	Maximum	Minimum	Coef. Var.
Aluminum	6302.5	6257.4	4900.0	37000.0	3.0	1.0
Antimony	*5	NA	NA	NA	NA	NA
Arsenic	*10	NA	NA	NA	NA	NA
Barium	25.6	30.8	18.5	200.0	5.0	1.2
Beryllium	*0.3	NA	NA	NA	NA	NA
Cadmium	1.4	1.5	1.0	10.0	1.0	1.1
Calcium	94.5	98.4	72.5	530.0	7.7	1.0
Chromium	5.0	6.4	2.4	30.0	1.0	1.3
Cobalt	2.0	0.0	2.0	2.2	2.0	0.0
Copper	1.7	1.1	1.2	5.8	1.0	0.6
Iron	3493.1	3957.6	1900.0	16000.0	2.0	1.1
Lead	*5.9	2.5	5.0	18.0	5.0	0.4
Magnesium	119.0	76.5	94.5	300.0	23.0	0.6
Manganese	71.4	111.9	31.5	560.0	1.0	1.6
Nickel	2.9	1.7	2.1	10.0	2.0	0.6
Potassium	166.9	111.2	100.0	570.0	100.0	0.7
Selenium	*10	NA	NA	NA	NA	NA
Silver	*3	NA	NA	NA	NA	NA
Sodium	*10.3	1.1	10.0	15.0	10.0	0.1
Thallium	*50	NA	NA	NA	NA	NA
Vanadium	11.0	14.2	5.3	55.0	1.0	1.3
Zinc	5.3	4.9	4.3	28.0	1.0	0.9
Mercury	*0.25	NA	NA	NA	NA	NA

Note:

1. The "*" indicates that the average is influenced by many "less than" values.
2. NA = not applicable.

3.2 Radiological Monitoring of Terrestrial Vegetation On and Adjacent to SRS

3.2.1 Summary

The Environmental Surveillance and Oversight Program (ESOP) monitors for the presence of radionuclides in vegetation around the Savannah River Site (SRS) stemming from SRS operations. In 2003, ESOP conducted independent vegetation monitoring at 16 locations around the perimeter of the SRS; three former SRS monitoring locations 25 miles from the center of SRS; and eight locations selected at random from within a 50-mile radius of SRS. Sampling was performed quarterly in February, May, August, and November.

RESULTS AND DISCUSSION

Results from all analyses, listed by station and date, are included in Section 3.2.4. Summary statistics for perimeter stations are presented in Section 3.2.5.

Tritium

Tritium was detected in vegetation from 15 of the 16 perimeter sites sampled in 2003, although none of the stations produced tritium levels greater than the LLD in all four sampling months. The highest tritium level in 2003 was 5099 pCi/L, and occurred in February on the west side of SRS at station BWL-009. Tritium was detected at two of the 25-mile radius stations and one randomly selected station in 2003.

Fifteen of the perimeter stations sampled in February exhibited tritium activity greater than the LLD, the highest level being 5099 pCi/L from BWL-009 near D- Area. One 25-mile and one 50-mile radius station, both in Orangeburg County, produced tritium activity.

Eleven of the perimeter stations sampled in May exhibited tritium activity greater than the LLD, with the highest level, 921 pCi/L, coming from ALD-001 on the southeast side of SRS. One 25-mile station, in Aiken County, produced tritium activity.

Vegetation from only four of the perimeter stations sampled in August exhibited tritium activity greater than the LLD. The highest activity level, 316 pCi/L, was from station AKN-005 on the north side of SRS. The Aiken County 25-mile station again produced detectable tritium activity.

Only two of the perimeter stations sampled in November exhibited tritium activity greater than the LLD. The highest activity level, 3823 pCi/L, was from Station AKN-003 on the northwest side of SRS. The Orangeburg County 25-mile station produced detectable tritium activity.

Tritium activity was generally detected uniformly around SRS in 2003. The highest tritium activities in 2003 were from sites on the western side of the SRS, in the vicinity of D-Area and Plant Vogtle. This is similar to results from 1998 through 2003 sampling (Figure 1, Section 3.2.2). The Heavy Water Facility in D-Area processed residual heavy water from past reactor operations and other DOE-SR sites' activities through 1998. Residual tritium from releases at

this facility may be partly responsible for higher tritium levels in the nearby vegetation. Tritium releases from the nearby Vogtle Electric Generating Plant in Georgia may also account for elevated tritium levels in this area of the SRS.

Tritium analysis results from ESOP and DOE-SR sampling in May 2003 are given section 3.2.3, table 1. Data comparison of associated locations from the two programs was conducted by converting SRS reported activity levels. However, differences between the two programs in sampling dates, the vegetation sampled, and analysis methods make results difficult to compare. The DOE-SR program detected tritium in samples from one station; tritium was detected in samples from four nearby stations by the ESOP program. Results from the one colocation were less than the detection limit for the DOE program and slightly above the ESOP detection limit.

Gamma

The naturally occurring isotope potassium-40 (K-40) was detected from all stations where gamma samples were collected in 2003. Because it is a natural isotope, K-40 results will not be discussed in this report, but are presented in Section 3.2.4.

Cesium-137 (Cs-137) was detected at eight of the 13 perimeter stations sampled in 2003. Six of these stations produced Cs-137 results greater than the sample MDA in all four months sampled. The highest activity levels occurred at station AKN-005 on the north side of SRS.

Three naturally occurring gamma-emitting radionuclides were detected in samples but are not presented in this report: beryllium-7 (Be-7), lead-212 (Pb-212), and lead-214 (Pb-214). Be-7 was detected in vegetation from all 13 perimeter stations and two 25-mile stations. Pb-212 was detected at one perimeter and two 25-mile stations. Pb-214 was detected at eight perimeter stations, all three 25-mile stations, and both 50-mile stations that were sampled.

Results of analysis for Cs-137 followed established trends in 2003. Station AKN-005 on the north side of the SRS produced detectable activity in all sampling months. This station has also produced Cs-137 activity from all samples collected in previous sampling years (Figure 2, 3.2.3). The 2003 average result from AKN-005 was an order-of-magnitude greater than all other stations sampled. One station east of AKN-005 along the perimeter also exhibited Cs-137 activity in all samples in 2003, as well as in 1998-2002. A cluster of higher Cs-137 levels was centered around station ALD-001 on the southeast side of the SRS; three adjacent stations produced detectable activity in all sampling months. This was consistent with results from 1998-2002. One other station, southwest of A- and M-Areas, produced detectable Cs-137 in all samples, as it has consistently since 1998.

Gamma analysis results for Cs-137 from ESOP and DOE-SR sampling in May 2003 are presented in section 3.2.3, table 2. The EMS air station on Patterson Mill Road, a co-location between the two programs, did not produce similar results between the two programs as it had in previous years. For the other three EMS stations, the closest ESOP stations were selected for comparison. ESOP sampling resulted in activity levels greater than the sample MDA at two of the stations near EMS sampling locations, whereas EMS sampling produced detectable Cs-137 levels at one of those sites.

CONCLUSIONS / RECOMMENDATIONS

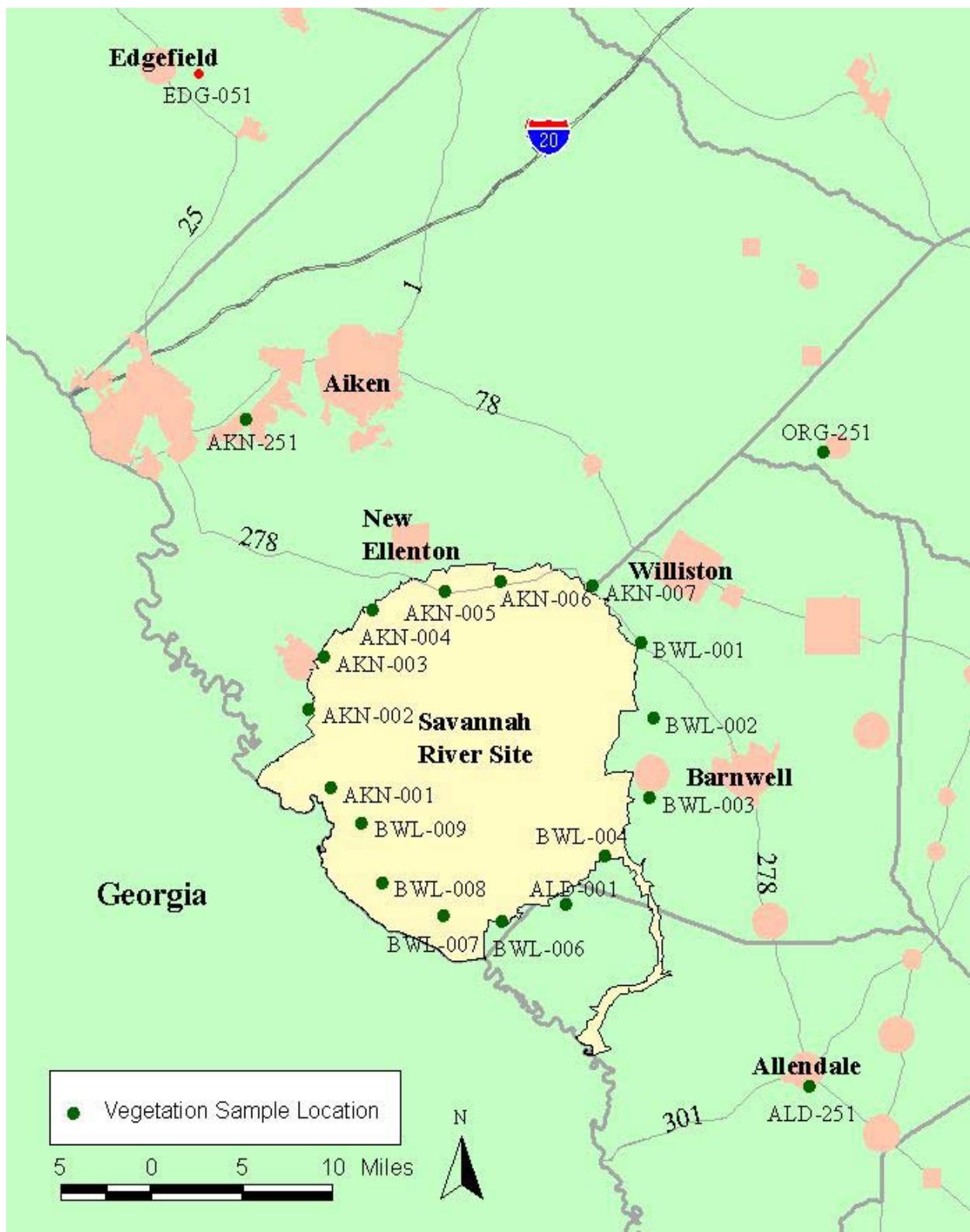
ESOP conducted independent vegetation monitoring in 2003 at 16 locations around the perimeter of the SRS, three locations 25 miles from the center of SRS, and eight locations selected at random from within a 50-mile radius of SRS. Tritium was detected in vegetation at 15 of the 16 perimeter stations sampled in 2003, two of the 25-mile, and one of the 50-mile stations. As in previous years, activity levels were higher in vegetation collected from the western side of SRS, including near D-Area. ESOP data confirms that elevated tritium levels at the site perimeter are due to atmospheric releases from SRS, but that tritium levels decrease with increasing distance from SRS facilities.

A comparison of ESOP and DOE-SR tritium data was performed for samples collected in May, although there are differences in analysis and sampling methods (e.g., ESOP collects leaves from trees, whereas EMS conducts annual grass collections). The results for the one co-location on Patterson Mill Road were below the detection limit for DOE-SR and just above the detection limit for ESOP. Both programs detected tritium in vegetation near the Williston gate. DOE-SR data are reported in pCi/g without denoting whether this activity relates to a gram of water or a gram of wet vegetation. ESOP recommends that DOE-SR report tritium activity in a more relevant manner, such as picocuries per milliliter (pCi/ml) as in previous reports, to reflect the tritium activity in the water extracted from the sample.

The ESOP vegetation monitoring program was changed in 2001 to concentrate on locations where Cs-137 was detected in vegetation in previous years. Since then, samples from nine permanent stations and one randomly selected station are analyzed for gamma-emitting radionuclides. At these locations in 2003, Cs-137 was detected at levels similar to 1998-2002. It is unclear why these sites produce higher cesium levels, as they are not located near SRS facilities, nor in areas known to be affected by past releases. ESOP and DOE-SR results from the station on Patterson Mill Road produced dissimilar Cs-137 activity levels. A review of critical pathways for radiation exposure around SRS indicates that vegetation is an important exposure pathway due to atmospheric releases from SRS sources. Analysis of 2002 samples was used to determine that an increase in monitoring frequency to four quarterly collections in 2003 was warranted. This schedule will be continued in 2004. Also in 2004 sampling will be conducted at randomly selected sites around South Carolina. This is being performed to establish background and near-SRS levels for tritium and gamma-emitting radionuclides.

3.2.2

Map 7. Terrestrial Vegetation



3.2.3 Tables and Figures

Radiological Monitoring of Terrestrial Vegetation, 2003

Figure 1. Average Tritium In Vegetation at SRS Perimeter Stations, 1998-2003.

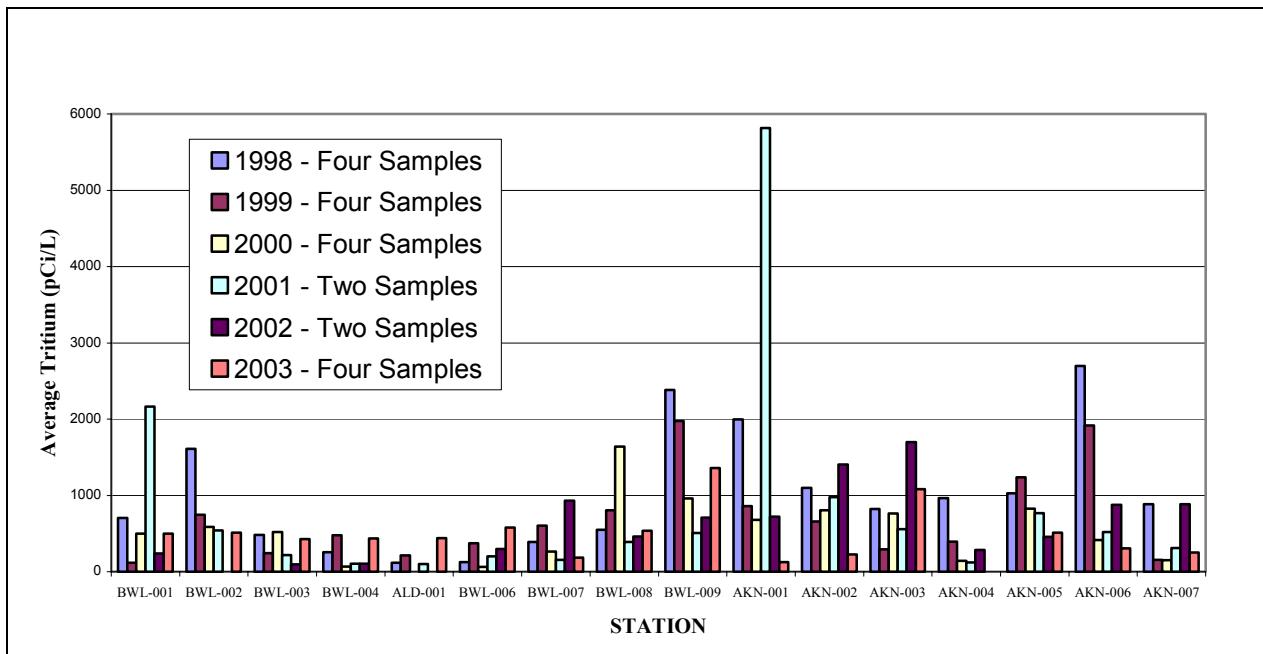
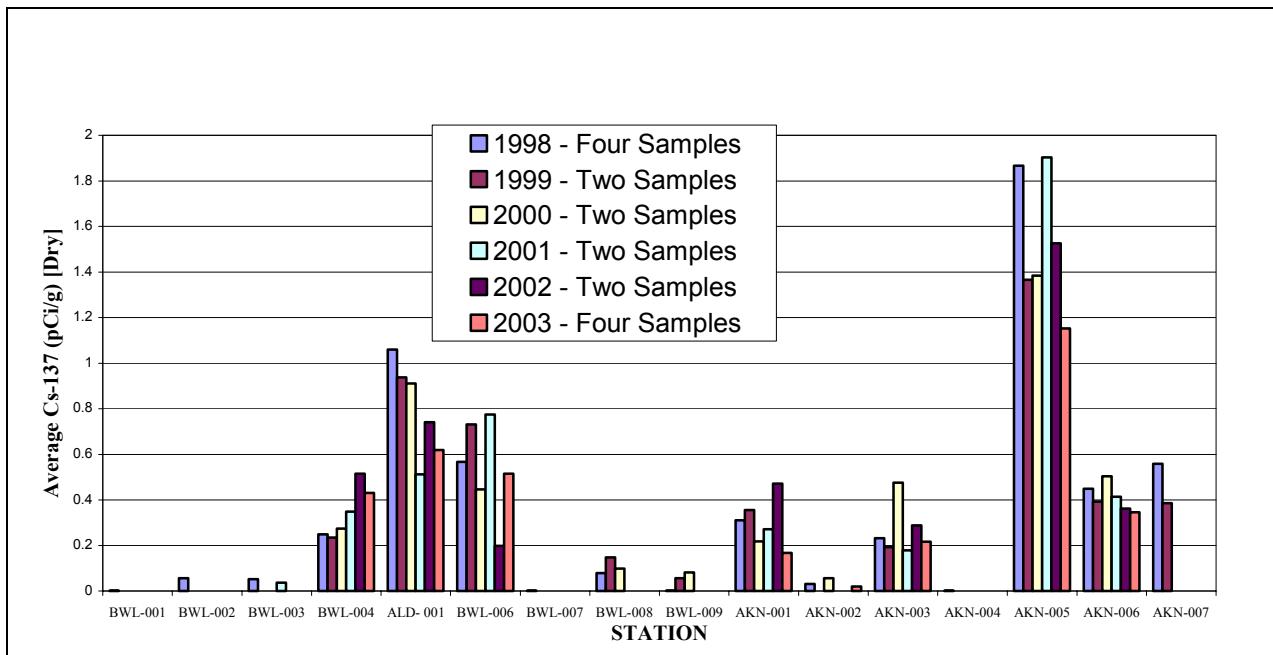


Figure 2. Average Cesium-137 In Vegetation at SRS Perimeter Stations, 1998-2003.



Radiological Monitoring of Terrestrial Vegetation, 2003**Table 1. Comparison of Tritium Analyses, DOE-SR and ESOP Data.**

SRS DATA (WSRC 2004)		Tritium		ESOP DATA		Tritium
Station	Date	pCi/g	pCi /L ^a	Station	Date	pCi/L
D-Area	5/21/03	0.0225	NA	BWL-009 ^b	5/13/03	330
				AKN-001 ^b	5/13/03	499
Green Pond	5/21/03	0.0072	NA	AKN-003 ^b	5/13/03	<199
				AKN-004 ^b	5/13/03	<199
Darkhorse @ Williston Gate	5/21/03	0.0381	181	AKN-007 ^b	5/28/03	226
				BWL-001 ^b	5/28/03	203
Patterson Mill Road ^c	5/21/03	0.0370	NA	BWL-004 ^c	5/28/03	277

Bold denotes results less than the WSRC Minimum Detectable Concentration

< - denotes less than reported Lower Limit of Detection

^a Converted (See Section 5.1)^b ESOP stations on either side of SRS stations^c Co-location**Table 2. Comparison of Gamma Analyses, DOE-SR and ESOP Data.**

SRS DATA (WSRC 2004)		Cs-137		ESOP DATA		Cs-137	
Location	Date	pCi/g (dry)	+/- 1 sig	Station	Date	pCi/g (dry)	+/- 2 sig
D-Area	5/21/03	0.133	0.051	AKN-001 ^a	5/13/03	0.492	0.088
Green Pond	5/21/03	0.050	0.025	AKN-003 ^a	5/13/03	0.190	0.088
Darkhorse @ Williston Gate	5/21/03	0.125	0.038	AKN-007 ^a	5/28/03	<0.068	
Patterson Mill Road ^b	5/21/03	0.070	0.032	BWL-004 ^b	5/28/03	0.618	0.083

Bold denotes results less than the WSRC Minimum Detectable Concentration^a Closest ESOP station with gamma collections^b Co-location

3.2.4 Data

Terrestrial Vegetation Radiological Monitoring Data, 2003

Terrestrial Vegetation Radiological Monitoring, 2003

Station: AKN-001 - TNX Area					
Sample Date:		02/12/03	05/13/03	08/18/03	11/18/03
Radionuclides	Tritium (pCi/L)	<197	499	<193	<218
	+/- 2 sigma		104		
	K-40 (pCi/g)	4.144	5.563	2.851	5.239
	+/- 2 sigma	1.153	1.334	0.711	1.246
	Cs-137 (pCi/g)	<0.062	0.492	0.177	<0.106
	+/- 2 sigma		0.088	0.062	

Station: AKN-002 - Crackerneck gate					
Sample Date:		02/12/03	05/13/03	08/18/03	11/18/03
Radionuclides	Tritium (pCi/L)	899	<199	<193	<218
	+/- 2 sigma	118			
	K-40 (pCi/g)	3.203	5.917	5.565	7.056
	+/- 2 sigma	0.689	1.457	0.826	0.905
	Cs-137 (pCi/g)	<0.040	<0.069	<0.060	0.079
	+/- 2 sigma				0.035

Station: AKN-003 - SRS Rd. 1					
Sample Date:		02/12/03	05/13/03	08/18/03	11/18/03
Radionuclides	Tritium (pCi/L)	508	<199	<193	3823
	+/- 2 sigma	104			188
	K-40 (pCi/g)	2.970	<0.670	4.138	3.640
	+/- 2 sigma	1.119		0.726	0.677
	Cs-137 (pCi/g)	0.181	0.190	0.297	0.195
	+/- 2 sigma	0.070	0.088	0.077	0.043

Station: AKN-004 - SRS Rd. 1					
Sample Date:		02/12/03	05/13/03	08/18/03	11/18/03
Radionuclides	Tritium (pCi/L)	<197	<199	<193	<218
	+/- 2 sigma				

Station: AKN-005 - U.S. Hwy. 278					
Sample Date:		02/20/03	05/28/03	08/12/03	11/04/03
Radionuclides	Tritium (pCi/L)	1312	421	316	<195
	+/- 2 sigma	129	102	97	
	K-40 (pCi/g)	4.113	5.271	2.671	4.142
	+/- 2 sigma	0.769	0.862	0.729	1.039
	Cs-137 (pCi/g)	0.116	1.826	1.271	1.395
	+/- 2 sigma	0.041	0.161	0.116	0.138

Terrestrial Vegetation Radiological Monitoring, 2003

Station: AKN-006 - U.S. Hwy. 278					
Sample Date:		02/20/03	05/28/03	08/12/03	11/04/03
Radionuclides	Tritium (pCi/L)	1016	<190	215	<195
	+/- 2 sigma	120		93	
	K-40 (pCi/g)	4.296	7.157	4.030	5.139
	+/- 2 sigma	0.754	0.936	0.669	0.804
	Cs-137 (pCi/g)	0.167	0.510	0.457	0.246
	+/- 2 sigma	0.046	0.077	0.069	0.055

Station: AKN-007 - Aiken Co. Rd. 74					
Sample Date:		02/20/03	05/28/03	08/12/03	11/04/03
Radionuclides	Tritium (pCi/L)	775	226	<198	<195
	+/- 2 sigma	112	90		
	K-40 (pCi/g)	5.503	9.670	11.36	9.612
	+/- 2 sigma	0.848	1.064	0.975	0.899
	Cs-137 (pCi/g)	<0.040	<0.068	<0.050	<0.039
	+/- 2 sigma				

Station: BWL-001 - U.S. Hwy. 278					
Sample Date:		02/12/03	05/28/03	08/12/03	11/18/03
Radionuclides	Tritium (pCi/L)	1258	203	<198	527
	+/- 2 sigma	127	89		111
	K-40 (pCi/g)	NS	NS	4.229	NS
	+/- 2 sigma			0.728	
	Cs-137 (pCi/g)	NS	NS	<0.054	NS
	+/- 2 sigma				

Station: BWL-002 - Barnwell Co. Rd. 21					
Sample Date:		02/12/03	05/28/03	08/12/03	11/18/03
Radionuclides	Tritium (pCi/L)	1564	261	225	<218
	+/- 2 sigma	137	91	98	

Station: BWL-003 - Barnwell Co. Rd. 54					
Sample Date:		02/12/03	05/28/03	08/12/03	11/18/03
Radionuclides	Tritium (pCi/L)	1706	<190	<198	<218
	+/- 2 sigma	140			
	K-40 (pCi/g)	NS	8.165	NS	NS
	+/- 2 sigma		0.940		
	Cs-137 (pCi/g)	NS	<0.058	NS	NS
	+/- 2 sigma				

Terrestrial Vegetation Radiological Monitoring, 2003

Station: BWL-004 - Air Station 614-62G					
Sample Date:		02/20/03	05/28/03	08/12/03	11/04/03
Radionuclides	Tritium (pCi/L)	1469	277	<198	<195
	+/- 2 sigma	134	92		
	K-40 (pCi/g)	2.971	4.180	3.536	5.110
	+/- 2 sigma	0.869	0.888	0.669	0.845
	Cs-137 (pCi/g)	0.270	0.618	0.313	0.524
	+/- 2 sigma	0.060	0.083	0.072	0.070

Station: BWL-006 - Allendale Gate					
Sample Date:		02/20/03	05/28/03	08/12/03	11/18/03
Radionuclides	Tritium (pCi/L)	1707	603	<198	<218
	+/- 2 sigma	140	104		
	K-40 (pCi/g)	1.657	4.122	4.197	5.646
	+/- 2 sigma	0.650	0.892	0.745	0.798
	Cs-137 (pCi/g)	0.539	0.216	0.311	0.997
	+/- 2 sigma	0.077	0.074	0.075	0.119

Station: BWL-007 - SRS Rd. A-17					
Sample Date:		02/12/03	05/13/03	08/18/03	11/18/03
Radionuclides	Tritium (pCi/L)	288	219	238	<218
	+/- 2 sigma	95	93	92	
	K-40 (pCi/g)	NS	NS	NS	5.103
	+/- 2 sigma				0.852
	Cs-137 (pCi/g)	NS	NS	NS	<0.040
	+/- 2 sigma				

Station: BWL-008 - SRS Rd. A-13					
Sample Date:		02/12/03	05/13/03	08/18/03	11/18/03
Radionuclides	Tritium (pCi/L)	1830	319	<193	<218
	+/- 2 sigma	145	98		
	K-40 (pCi/g)	6.121	NS	NS	NS
	+/- 2 sigma	1.140			
	Cs-137 (pCi/g)	<0.053	NS	NS	NS
	+/- 2 sigma				

Station: BWL-009 - D-Area					
Sample Date:		02/12/03	05/13/03	08/18/03	11/18/03
Radionuclides	Tritium (pCi/L)	5099	330	<193	<218
	+/- 2 sigma	215	100		

Terrestrial Vegetation Radiological Monitoring, 2003

Station: ALD-001 - Allendale Co. Rd. 12					
Sample Date:		02/20/03	05/28/03	08/12/03	11/18/03
Radionuclides	Tritium (pCi/L)	843	921	<198	<218
	+/- 2 sigma	114	115		
	K-40 (pCi/g)	4.131	5.407	3.219	5.517
	+/- 2 sigma	0.875	7.811	1.051	0.662
	Cs-137 (pCi/g)	0.287	0.764	0.741	0.683
	+/- 2 sigma	0.062	0.095	0.106	0.094

Station: ALD-251 - Allendale, SC					
Sample Date:		02/05/03	05/06/03	08/25/03	11/25/03
Radionuclides	Tritium (pCi/L)	<181	<199	<193	<192
	+/- 2 sigma				
	K-40 (pCi/g)	NS	NS	NS	3.244
	+/- 2 sigma				0.598
	Cs-137 (pCi/g)	NS	NS	NS	<0.038
	+/- 2 sigma				

Station: ORG-251 - Springfield, SC					
Sample Date:		02/05/03	05/06/03	08/25/03	11/25/03
Radionuclides	Tritium (pCi/L)	215	<199	<193	205
	+/- 2 sigma	86			89
	K-40 (pCi/g)	NS	NS	NS	9.262
	+/- 2 sigma				0.996
	Cs-137 (pCi/g)	NS	NS	NS	<0.040
	+/- 2 sigma				

Station: AKN-251 - Langley, SC					
Sample Date:		02/05/03	05/06/03	08/25/03	11/25/03
Radionuclides	Tritium (pCi/L)	<181	514	301	<192
	+/- 2 sigma		104	98	
	K-40 (pCi/g)	NS	NS	NS	8.584
	+/- 2 sigma				0.871
	Cs-137 (pCi/g)	NS	NS	NS	<0.040
	+/- 2 sigma				

Station: ORG-505 - Orangeburg Co., SC					
Sample Date:		02/05/03			
Radionuclides	Tritium (pCi/L)	239			
	+/- 2 sigma	87			

Terrestrial Vegetation Radiological Monitoring, 2003

Station:	EDG-506 - Edgefield Co., SC	
Sample Date:		02/05/03
Radionuclides	Tritium (pCi/L)	<181
	+/- 2 sigma	

Station:	ORG-506 - Orangeburg Co., SC	
Sample Date:		05/06/03
Radionuclides	Tritium (pCi/L)	<199
	+/- 2 sigma	

Station:	BAM-506 - Bamberg Co., SC	
Sample Date:		05/06/03
Radionuclides	Tritium (pCi/L)	<199
	+/- 2 sigma	

Station:	ORG-507 - Orangeburg Co., SC	
Sample Date:		08/25/03
Radionuclides	Tritium (pCi/L)	<193
	+/- 2 sigma	

Station:	MCC-502 - McCormick Co., SC	
Sample Date:		08/25/03
Radionuclides	Tritium (pCi/L)	<193
	+/- 2 sigma	

Station:	LEX-504 - Lexington Co., SC	
Sample Date:		11/25/03
Radionuclides	Tritium (pCi/L)	<192
	+/- 2 sigma	
	K-40 (pCi/g)	7.234
	+/- 2 sigma	0.869
	Cs-137 (pCi/g)	<0.040
	+/- 2 sigma	

Station:	HAM-505 - Hampton Co., SC	
Sample Date:		11/25/03
Radionuclides	Tritium (pCi/L)	<192
	+/- 2 sigma	
	K-40 (pCi/g)	9.270
	+/- 2 sigma	1.035
	Cs-137 (pCi/g)	<0.040
	+/- 2 sigma	

3.2.5 Summary Statistics

Terrestrial Vegetation Radiological Monitoring, 2003

Tritium Levels (pCi/L) from SRS Perimeter Stations, 2003						
Station	N (ND)	Mean	Std Dev	Median	Min	Max
A KN-001	4 (2)	125	250	0	0	499
A KN-002	4 (3)	225	450	0	0	899
A KN-003	4 (2)	1083	1842	254	0	3823
A KN-004	4 (4)	0	0	0	0	0
A KN-005	4 (1)	512	562	369	0	1312
A KN-006	4 (2)	308	483	108	0	1016
A KN-007	4 (2)	250	366	113	0	775
B WL-001	4 (1)	497	552	365	0	1258
B WL-002	4 (1)	513	710	243	0	1564
B WL-003	4 (3)	427	853	0	0	1706
B WL-004	4 (2)	437	701	139	0	1469
A LD-001	4 (2)	441	510	422	0	921
B WL-006	4 (2)	578	805	302	0	1707
B WL-007	4 (1)	186	128	229	0	288
B WL-008	4 (2)	537	875	160	0	1830
B WL-009	4 (2)	1357	2499	165	0	5099

ND denotes non-detect

Includes non-detects as zeros

Cesium-137 Levels (pCi/g - Dry) from SRS Perimeter Stations, 2003						
Station	N (ND)	Mean	Std Dev	Median	Min	Max
A KN-001	4 (2)	0.167	0.232	0.089	0	0.492
A KN-002	4 (3)	0.020	0.040	0.000	0	0.079
A KN-003	4 (0)	0.216	0.054	0.193	0.181	0.297
A KN-005	4 (0)	1.152	0.730	1.333	0.116	1.826
A KN-006	4 (0)	0.345	0.165	0.352	0.167	0.510
A KN-007	4 (4)	0.000	0.000	0.000	0	0
B WL-004	4 (0)	0.431	0.167	0.419	0.270	0.618
A LD-001	4 (0)	0.619	0.224	0.712	0.287	0.764
B WL-006	4 (0)	0.516	0.348	0.425	0.216	0.997

ND denotes non-detect

Includes non-detects as zeros

Tritium Levels (pCi/L) in SRS Perimeter Vegetation Samples, 2003					
N	Mean	Std Dev	Median	Min	Max
64	467	890	0	0	5099

Includes non-detects as zeros

Cs-137 Levels (pCi/g-Dry) in SRS Perimeter Vegetation Samples, 2003					
N	Mean	Std Dev	Median	Min	Max
36	0.385	0.432	0.258	0	1.826

Includes non-detects as zeros

3.3 Radiological Monitoring of Edible Vegetation

3.3.1 Summary

The Department of Energy – Savannah River (DOE-SR) has historically conducted monitoring on and around the Savannah River Site (SRS) to determine activities of radionuclides in edible vegetation. Edible vegetation can be contaminated externally by direct deposition of airborne materials, water runoff, and precipitation that contains radioactivity. Vegetation can also be contaminated internally by uptake of radionuclides through the root system.

In 2003, the Environmental Surveillance and Oversight Program (ESOP) began a project that conducted independent monitoring at locations within a 10-mile radius of the SRS perimeter. Sampling began in the spring, with a total of 12 samples collected from five communities. Background samples were collected in Orangeburg, South Carolina. Personnel collected various types of edible vegetation according to the growing season and availability. The samples were analyzed for tritium and gamma-emitting radionuclides.

RESULTS AND DISCUSSION

Tritium

Tritium was detected at five of the 12 sample locations. All of the tritium levels found were just above the lower limit of detection of 196 picocuries per liter (pCi/L). These analytical results are located in Section 3.3.3. An evaluation of the analytical results indicates that the ESOP and DOE-SR data for 2003 are within the same order-of-magnitude.

Gamma-emitting radionuclides

No man-made gamma-emitters were detected in any of the samples in 2003. These results may be found in Section 3.3.3. DOE-SR detected cesium-137 in collards from two locations, and strontium-89,90 in collards from four locations. This was consistent with previous years' data.

CONCLUSIONS/RECOMMENDATIONS

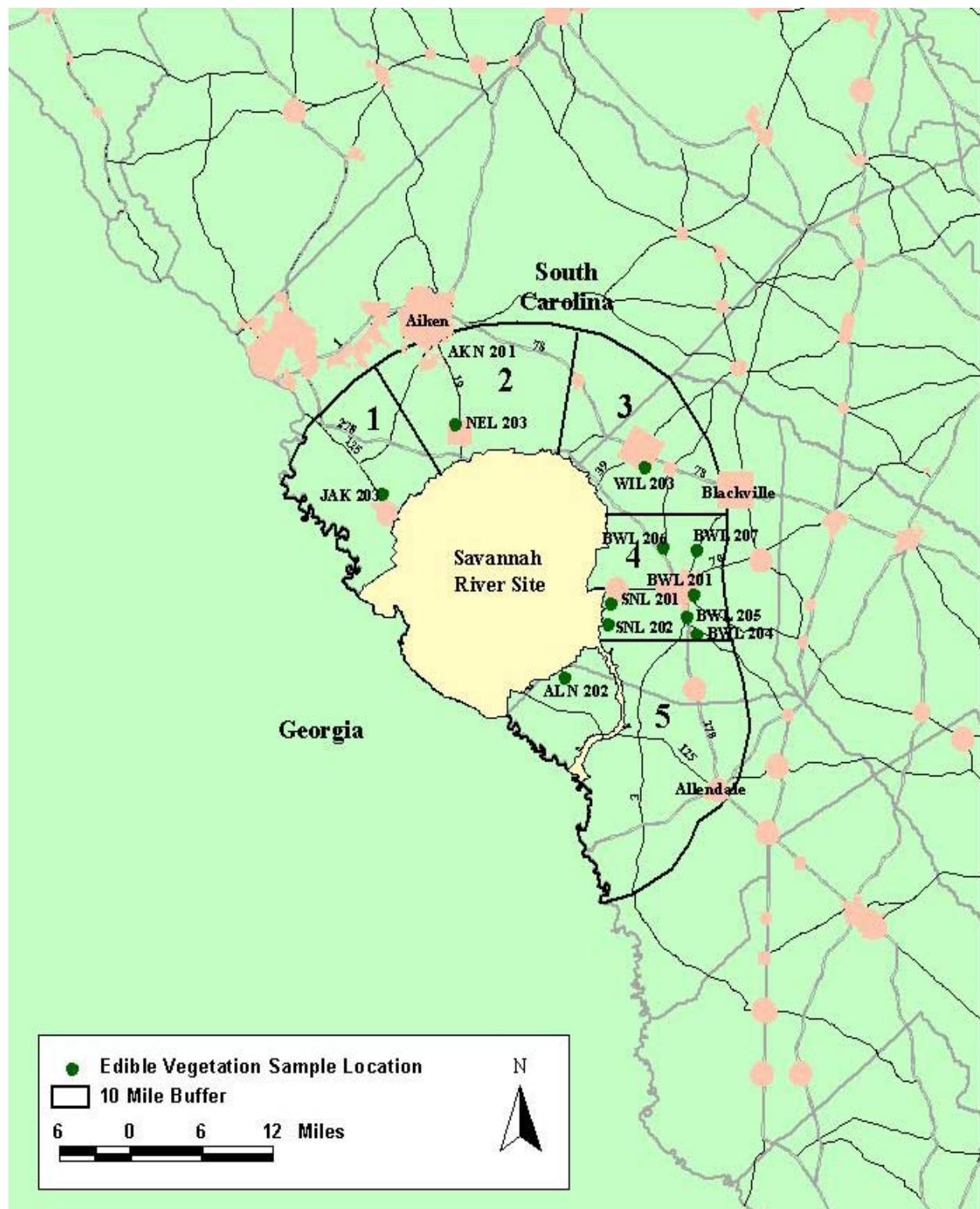
Five of the 12 edible vegetation samples collected for the season were found to have low concentrations of tritium (202 pCi/L – 841 pCi/L), likely a product of legacy and current airborne releases from DOE-SR operations. As the airborne tritium interacts with water in the atmosphere it becomes available to vegetation, entering plants thru root systems or from leaf surfaces encountering this moisture with small amounts of tritium contamination. These results are consistent with local historically reported data. Cesium-137 was detected in two of the collard samples collected by DOE-SR. SCDHEC ESOP had no detections for Cs-137.

For the sampling year 2004, ESOP plans to place a stronger emphasis on wild native plants (blackberries, muscadines, persimmons). These plants are not likely to undergo fertilization, which could possibly block the uptake of some nuclides of interest. Another point of interest lies

in the fact that these plants, which have evolved in the Sand Hills region of South Carolina, are capable of salvaging minerals from depleted soils, thus making them ideal bio-concentrators of radionuclides of concern that behave as chemical analogs.

3.3.2

Map 8. Edible Vegetation Monitoring Project



3.3.4 Data

Edible Vegetation Monitoring Data, 2003

Edible Vegetation Radiological Monitoring, 2003

Sample Location: JAK-203 Yellow Squash		
Sample Date:	06/20/03	
Radionuclides	Tritium (pCi/L)	<196
	+/-2 sigma	
	Cs-137 (pCi/g)	<0.017
	+/-2 sigma	

Sample Location: SNL-201 Wild Plum		
Sample Date:	05/27/03	
Radionuclides	Tritium (pCi/L)	204
	+/-2 sigma	90
	Cs-137 (pCi/g)	<0.016
	+/-2 sigma	

Sample Location: BWL-204 Blackberry		
Sample Date:	06/26/03	
Radionuclides	Tritium (pCi/L)	428
	+/-2 sigma	99
	Cs-137 (pCi/g)	<0.015
	+/-2 sigma	

Sample Location: BWL-206 Blackberry		
Sample Date:	06/27/03	
Radionuclides	Tritium (pCi/L)	554
	+/-2 sigma	107
	Cs-137 (pCi/g)	<0.017
	+/-2 sigma	

Sample Location: BWL-205 Blackberry		
Sample Date:	06/26/03	
Radionuclides	Tritium (pCi/L)	<196
	+/-2 sigma	
	Cs-137 (pCi/g)	<0.018
	+/-2 sigma	

Sample Location: BWL-207 Blackberry		
Sample Date:	06/27/03	
Radionuclides	Tritium (pCi/L)	202
	+/-2 sigma	91
	Cs-137 (pCi/g)	<0.011
	+/-2 sigma	

Sample Location: NEL-203 Wild Plums		
Sample Date:	05/27/03	
Radionuclides	Tritium (pCi/L)	841
	+/-2 sigma	113
	Cs-137 (pCi/g)	<0.018
	+/-2 sigma	

Sample Location: WIL-203 Yellow Squash		
Sample Date:	07/08/03	
Radionuclides	Tritium (pCi/L)	<196
	+/-2 sigma	
	Cs-137 (pCi/g)	<0.011
	+/-2 sigma	

Edible Vegetation Radiological Monitoring, 2003

Sample Location: ALN-202 Wild Plums		
Sample Date:		05/27/03
Radionuclides	Tritium (pCi/L)	<196
	+/-2 sigma	
	Cs-137 (pCi/g)	<0.015
	+/-2 sigma	

Sample Location: BWL-201 Potatoes		
Sample Date:		08/13/03
Radionuclides	Tritium (pCi/L)	<196
	+/-2 sigma	
	Cs-137 (pCi/g)	<0.012
	+/-2 sigma	

Sample Location: SNL-202 Wild Plums		
Sample Date:		05/27/03
Radionuclides	Tritium (pCi/L)	<196
	+/-2 sigma	
	Cs-137 (pCi/g)	<0.016
	+/-2 sigma	

Sample Location: ORG-201 Cucumbers		
Sample Date:		08/21/03
Radionuclides	Tritium (pCi/L)	<196
	+/-2 sigma	
	Cs-137 (pCi/g)	<0.012
	+/-2 sigma	

Sample Location: DUP #1		
Sample Date:		06/26/03
Radionuclides	Tritium (pCi/L)	338
	+/-2 sigma	95
	Cs-137 (pCi/g)	<0.017
	+/-2 sigma	

Sample Location: DUP #2		
Sample Date:		06/27/03
Radionuclides	Tritium (pCi/L)	398
	+/-2 sigma	100
	Cs-137 (pCi/g)	<0.018
	+/-2 sigma	

3.4 Radiological Monitoring of Dairy Milk

3.4.1 Summary

In 2003, Department of Energy-Savannah River (DOE-SR) sampled four dairy locations. The South Carolina Department of Health and Environmental Control (SCDHEC) Environmental Surveillance and Oversight Program (ESOP) personnel sampled dairy milk at seven cow dairy locations and five goat milk locations in 2003. This sampling was done to provide an independent source of data on concentrations of radionuclides in milk within a 50-mile radius of SRS.

Prior to 1995 the DOE-SR collected milk samples on a monthly basis from 17 locations within a 50-mile radius of the Savannah River Site (SRS). Due to changes in the Radiological Monitoring Program at DOE-SR only four sampling locations are currently being monitored by DOE-SR. Denmark, South Carolina is the only monitoring area common to both the SCDHEC ESOP milk locations, and the DOE-SR environmental monitoring program locations. Therefore, the Denmark area locations provide the best comparison of results. Other independent locations serve to monitor the environmental perimeter around SRS. SCDHEC personnel collected milk at 7 cow dairies and 5 goat locations during 2003. SCDHEC milk sample data are an independent survey of radioisotope activity levels in milk for tritium, cobalt-60, iodine-131, cesium-137, strontium-89, and strontium-90.

RESULTS AND DISCUSSION

The 2003 "Detection Only" Results

Comparisons between SCDHEC and DOE-SR data are difficult to assess where less than (LT) results are given for SCDHEC data, and negatives or zeros are included in DOE-SR data. SCDHEC does not produce data that is less than an actual minimum detectable concentration (MDC) because negatives and LT data are below reliable quantification or the minimum detectable activity (MDA) of the instrument methodology. The SCDHEC "detects only" comparisons include only positive physical detections above an instrument minimum detectable concentration or activity. However, DOE-SR reports results even if negative as part of a DOE requirement. This means that SCDHEC "detects only" results are expected to be higher in comparison to DOE-SR results. SCDHEC reporting of positive detections only serves as a conservative estimate that is protective of the public and the environment. SCDHEC also uses the Environmental Protection Agency (EPA) method (1980) of assigning values to MDAs in order to allow statistical comparison of LT data. The 0.5 MDA average should be considered the low end of a range estimate with the high end "detects only" as the maximum. The comparisons arising from different methodologies serve to indicate that the data are representative of the environment when two or more different program (SCDHEC and DOE-SR) methodologies give similar results. All analytical results are located in Section 3.4.4.

It is important to note that negative calculated DOE-SR numbers result when a larger instrument background is subtracted from a smaller gross sample measurement. However, negative activities have no physical significance, and the averages or other numbers that include their use are not physically accurate, but do lie within measurement error for statistical purposes. Only

one DOE-SR sample at Girard, Ga. was negative, but its use in the average (43.2 pCi/L includes the negative) effectively canceled out two other positive detects at that location. That average changes to 71.3 pCi/L if the negative is treated as a zero. Thus, the inclusion of negatives resulted in an average tritium value that was biased low for that location. Therefore, SCDHEC reports only positive detections as a conservative estimate of radiological concentrations. The assignment and use of non-quantifiable values plays a critical role where the number of positive detections are few (i. e. negatives, “< MDA”, statistical data containing assigned values). For example, the presence of only <MDA in an average of assigned values generates a calculation artifact when there is no actual detect to include in the average, and does not indicate the presence of a radioisotope. The EPA recommends using 0.5 times the MDA in statistical calculations. However, this biases the average when the detected results are few in number. Thus, SCDHEC uses only detects in order to remain conservative in stating an environmental concentration based on a minimal number of detections. The EPA guidance is also used for any statistical tests.

SCDHEC detected tritium in one cow milk sample (327 picocuries per liter (pCi/L) in Norway, SC), and one goat milk sample (301 pCi/L in Windsor, SC) in 2003. Thus, tritium averaged 314 pCi/L in milk for 2003. The highest tritium concentration that DOE-SR reported was found in Denmark, SC (328 pCi/L with an uncertainty of +/- 94.0 pCi/L). While the maximum detections were nearly the same, the SCDHEC detected tritium average results in cow milk were only within 3sd of the lower DOE-SR cow milk average (122 pCi/L). If lower results were achieved by SCDHEC then more detections would result in a lower average closer to the DOE-SR results. SCDHEC plans to lower these MDA limits in the future.

The following comparisons are limited to the average, standard deviation, and median. In the following tables “ND” is used to represent non-detects or the occurrence of only <MDA data. Table 1, section 3.4.3 presents the averages of only “detected values in 2003” that were greater than backgrounds. No negatives, MDA, or MDA assignments are included in these Table 2 averages in order to compare only physical detections. Also, by comparing only physical detections the need to compare every uncertainty involved in the calculations is eliminated.

DOE-SR and SCDHEC did not detect iodine-131 (I-131) in cow milk in 2003. Also, SCDHEC did not detect cobalt-60 (Co-60), but DOE-SR had an average detect of 1.35 picocuries per liter (pCi/L) with a standard deviation (1sd) of 0.83 pCi/L for their samples.

SCDHEC did not detect cesium-137 (Cs-137) in cow milk in 2003, whereas DOE-SR did detect an average of 1.55 pCi/L with a 1sd of 0.62 pCi/L. However, the average SCDHEC MDA for Cs-137 was 1.66 pCi/L, which was above the DOE-SR Cs-137 detected levels. Thus, the SCDHEC average MDA was higher than the DOE-SR detected results, and this means the SCDHEC detect average must be higher than the DOE-SR Cs-137 average. The SCDHEC goat milk did have one Cs-137 detect (6.14 pCi/L). DOE-SR did not collect goat milk in 2003. Therefore, Cs-137 detects in goat milk are higher by a factor of four compared to cow milk. These Cs-137 concentrations are far below the FDA derived intervention levels for each radionuclide in isolation in milk (1215 pCi/L).

The 2003 SCDHEC "detect only" average for strontium-90 (Sr-90) in cow milk was 1.22 pCi/L with a 1sd of 0.12 pCi/L (Table 1, section 3.4.3). The DOE-SR detect average for Sr-90 was 1.38 pCi/L with a 1sd of 0.78 pCi/L. Therefore, the SCDHEC cow milk Sr-90 detect data were within 1sd of the DOE-SR data. SCDHEC detected an average of 6.45 pCi/L Sr-90 in three goat milk samples. DOE-SR did not sample goat milk in 2003. The Sr-90 concentration in goat milk was approximately five times the Sr-90 concentrations found in cow milk. These Sr-90 concentrations are far below the FDA derived intervention levels for infant milk. Sr-90 detects in SCDHEC goat milk ranged from 1.52 to 11.1 pCi/L compared to a maximum of 2.93 pCi/L in a DOE-SR cow milk sample. This ratio of approximately 4:1 may represent the difference in the intrinsic transfer factor for Sr-90 uptake in goats versus cows, and the differences in uptake by the plants consumed by these animals. Goats have a shorter biological half-life than cows for most radionuclides, i.e., they bio-eliminate the radionuclide as waste faster.

DOE-SR and SCDHEC did not detect Sr-89 in cow milk in 2003. However, there was one SCDHEC goat milk Sr-89 detect of 6.47 pCi/L. DOE-SR did not sample goat milk in 2003. These Sr-89 concentrations are far below the FDA derived intervention levels for infant milk. The Denmark area goat milk location (2GM) results for Sr-89 (6.47 pCi/L) and Sr-90 (11.1 pCi/L) before background correction were elevated compared to cow milk (Sr-89 was <MDA and Sr-90 averaged 1.21 pCi/L) in the Denmark area (10 miles away). The nearest cow dairy was 5 miles away in Govan where Cs-137, Sr-89 and Sr-90 were all less than the MDA. This elevated concentration of these radioisotopes in goat milk compared to cow milk was probably a result of many uptake factors.

The background concentrations subtracted from the perimeter concentrations should allow an estimation of the tritium contributions inside the SRS perimeter by current tritium sources and past nuclear tests. However, all of the 2003 background detects except strontium-90 in goat milk were less than a minimum detectable level. Thus, the lack of a definitive background concentration does not allow the isolation of the detected tritium concentration to only the SRS as a source. Improved random sampling of the perimeter and background in 2004 should help to decrease the uncertainty.

A histogram plot (Figure 1, section 3.4.3) of SCDHEC 0.5 MDA tritium data, and DOE-SR Denmark data shows that the distributions are different. Despite these differences in data distribution, the SCDHEC and DOE-SR Denmark area tritium data are typically within 1SD. The higher tritium detects were in the north to northeast locations.

However, it is still apparent that goat milk does contain on the average more Cs-137 and Sr-89 and Sr-90 than cow milk. It is unknown whether this is due solely to bioconcentration or a difference in diet where plants consumed by goats have a different uptake ratio than those plants consumed by cows. However, it is known that goats do have a higher transfer factor than cows for certain radioisotopes (I-131). Also, a greater concentration of radionuclides in non-harvested forage is expected compared to harvested forage that regularly lowers uptake due to grazing.

CONCLUSIONS AND RECOMMENDATIONS

The analyses concluded that the SCDHEC 2003 detected data for tritium, cobalt-60, iodine-131, cesium-137, strontium-89 and strontium-90 in SRS perimeter area milk were at least within 2.5 standard deviations of the DOE-SR mean. The 2003 SCDHEC detection results were above background only for tritium and strontium-90 in cow milk. SCDHEC 2003 goat milk had the same detections plus cesium-137 and strontium-89.

A comparison of SCDHEC data from 1997 through 2003 indicated that the possible SRS range of contributions to milk above background averaged 14 to 47 pCi/L for tritium, 0 to 3 pCi/L for Cs-137, 5 to 19 pCi/L for Sr-89, and approximately zero for the other radionuclides (Sr-90, I-131, and Co-60) over the seven year period. However, some of this added radionuclide contamination to the environment also had other possible sources currently in operation near SRS.

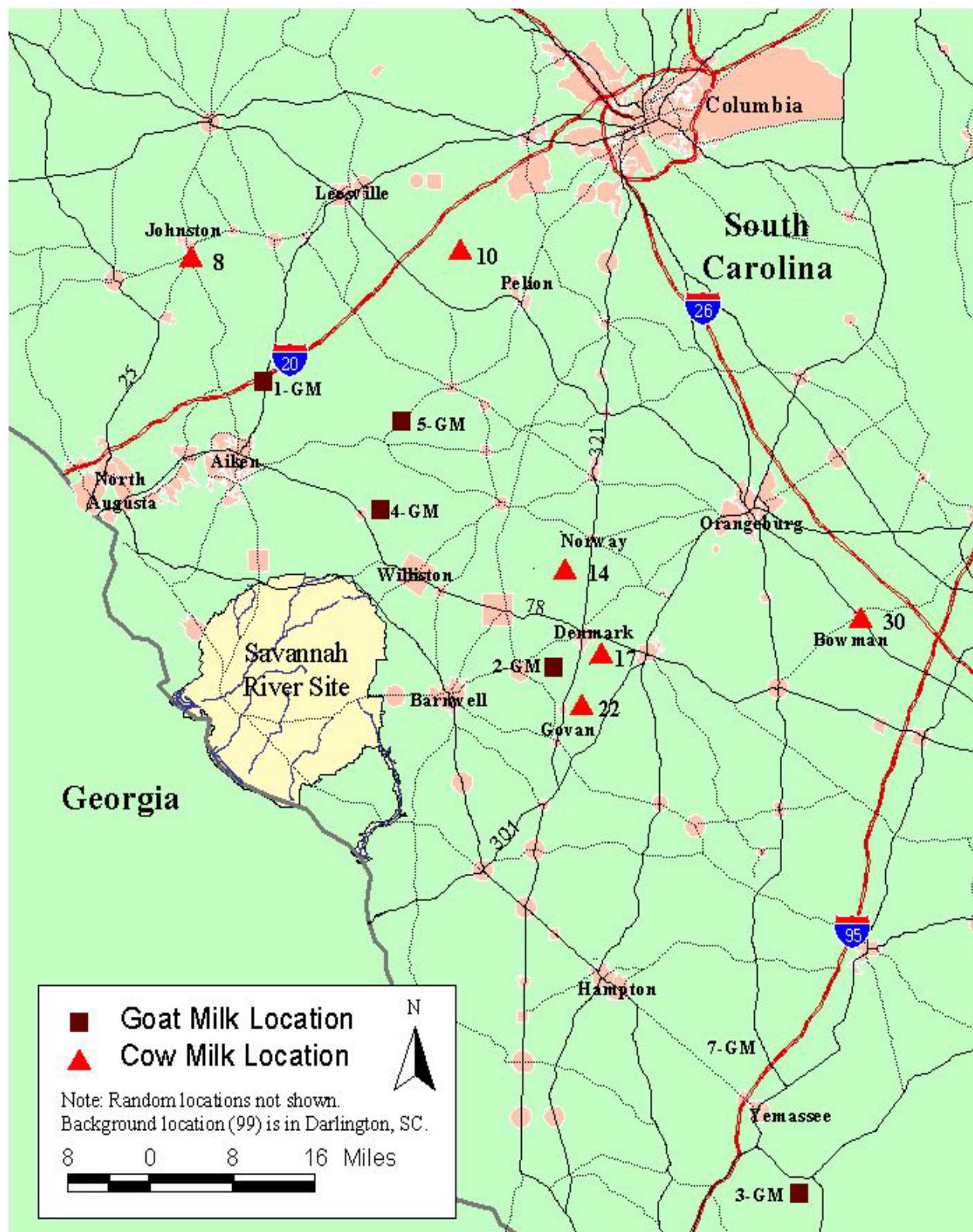
Goat milk appears to contain approximately four times the concentration as cow milk for certain radionuclides (Cs-137, Sr-89, and Sr-90). This difference appears related to the fact that some of the goats sampled were meat goats, and subsistence milk goats that were allowed access to random vegetation in forested areas and unharvested fields. Milk cows foraged on improved pastures that were harvested on a regular basis, which tends to lower the overall radionuclide burden. Also, goats may bioconcentrate some radionuclides more than cows, but this is offset by a shorter biological effective half-life in goats.

A major part of the observed radioactive contamination in milk today can still be attributed to past nuclear tests and nuclear reactor operations based on the half-life of the radionuclides and former Environmental Radiation Ambient Monitoring System (ERAMS) data. A random SRS perimeter and South Carolina background study beginning in 2004 may provide a more accurate statistical assessment of the radionuclide levels in various media throughout the state. Major resuspension mechanisms such as farming and controlled burns will continue to redistribute some radionuclides contained in surface soil and plants. The detected concentrations are well below Food and Drug Administration (FDA) guidelines for infant milk.

The similarity of results between the two environmental programs indicate that the data averages were within 2.5 standard deviations of the maximum for all radionuclides sampled. SCDHEC concludes that the similarity of the two results serve to co-evaluate both programs and further indicates that the exposure to the public through milk consumption was adequately sampled in 2003 for cow milk. However, the few detects recorded for goat milk beginning in 2003 and their higher concentrations for some radionuclides indicated that increased sampling of goat milk should continue. SCDHEC should increase random sampling of perimeter and background samples to improve the capability for statistical analyses and characterization of radionuclide exposure through the consumption of milk.

3.4.2

Map 9. Radiological Monitoring Locations for Dairy Milk



3.4.3 Tables and Figures

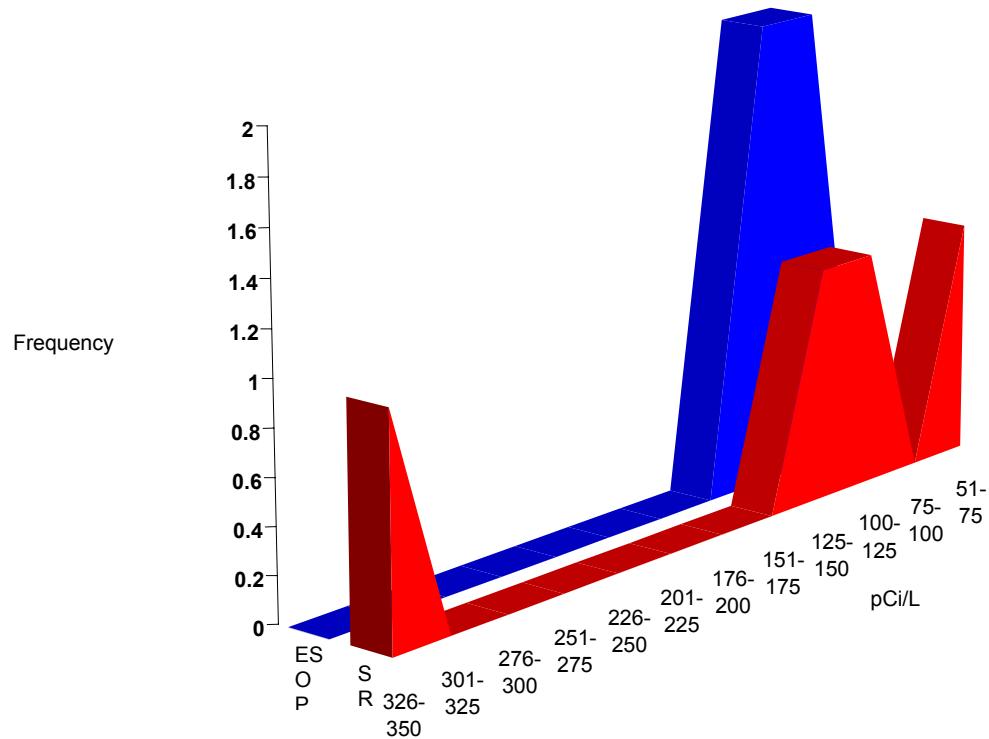
Radiological Monitoring of Dairy Milk, 2003

Table 1. SCDHEC and SRS Descriptive Statistics for Milk "Detects" Only.

pCi/L	ESOP Cow Milk			SRS Cow Milk			
	Avg	sd	Median		Avg	sd	Median
H-3	327	*	327	H-3	122	86.43	106.75
I-131	ND	ND	ND	I-131	NS		
Co-60	ND	ND	ND	Co-60	1.35	0.83	1.36
Cs-137	ND	ND	ND	Cs-137	1.55	0.62	1.77
Sr-90	1.22	0.12	1.22	Sr-90	1.38	0.78	1.32
Sr-89	ND	ND	ND	Sr-89	NS		
ESOP Goat Milk				ESOP Backgrounds - Detects Only			
	Avg	sd	Median	Cow	Goat		
H-3	301	*	301	ND	ND		
I-131	ND	ND	ND	ND	ND		
Co-60	ND	ND	ND	ND	ND		
Cs-137	6.14	*	6.14	ND	ND		
Sr-90	6.45	4.8	6.74	ND	11		
Sr-89	6.47	ND	ND	ND	ND		

Notes:

1. * = One detect only and standard deviation not applicable.
2. NS = no sample
3. The "ND" for "nondetects" is used for "<MDA" results which cannot actually be proven to be zero.
4. Avg = average,
5. sd = standard deviation

Radiological Monitoring of Dairy Milk, 2003**Figure 1. Frequency Distribution of ESOP and SOE-SR Milk Data at Denmark, SC.**

3.4.4 Data**Dairy Milk Monitoring, 2003**

Cow Milk.....	242
Milk Solids	246
Goat Milk	247

Radiological Monitoring of Dairy Milk, 2003

Cow Milk

		< 2 4 1	< 2 5 0	< 2 5 2	< 2 3 7
		< 1 . 9 1 7 E + 0 2	< 2 . 7 3 8 E + 0 1	< 5 . 6 2 7 E + 0 1	< 8 . 6 6 8 E + 0 0
		< 2 . 7 0 0 E + 0 0	< 2 . 7 0 0 E + 0 0	< 1 . 9 7 0 E + 0 0	< 1 . 7 3 4 E + 0 0
C o - 6 0	M D A	< 2 . 5 1 6 E + 0 0	< 2 . 9 5 6 E + 0 0	< 1 . 8 5 5 E + 0 0	< 1 . 5 9 7 E + 0 0
S a m p l e D a t e :		1 Q 0 3	2 Q 0 3		
R a d i o n u c l i d e s :	S r - 8 9	< - 5 . 9 5 E + 0 0	1 . 2 7 E + 0 0		
	+ / - 2	9 . 7 0 E + 0 0	2 . 4 0 E + 0 0		
	M D A	1 . 0 3 E + 0 1	2 . 6 9 E + 0 0		
	S r - 9 0	1 . 6 9 E + 0 0	4 . 9 9 E - 0 1		
	+ / - 2	1 . 3 0 E + 0 0	4 . 7 0 E - 0 1		
	M D A	2 . 0 1 E + 0 0	9 . 6 7 E - 0 1		

1. "<" is less than.
2. #8 cow dairy is an SRS perimeter location.
3. 1Q 03 is first quarter of 2003.
4. Detects are in bold. No detects at #8 dairy.
5. "+/-2" is plus or minus two standard deviations.

S a m p l e L o c a t i o n : Leesville		# 1 0			
S a m p l e D a t e :		3 / 3 / 0 3	5 / 2 3 / 0 3	8 / 1 3 / 0 3	1 0 / 1 4 / 0 3
R a d i o n u c l i d e s :	T r i t i u m	< 2 4 1	< 2 5 0	< 2 5 3	< 2 3 6
	+ / - 2				
	L L D				
	I - 1 3 1	< 2 . 2 1 8 E + 0 2	< 2 . 6 2 8 E + 0 1	< 5 . 1 6 6 E + 0 1	< 8 . 8 1 2 E + 0 0
	+ / - 2				
	M D A				
	C s - 1 3 7	< 2 . 7 0 5 E + 0 0	< 2 . 6 9 5 E + 0 0	< 2 . 0 5 4 E + 0 0	< 1 . 4 9 9 E + 0 0
	+ / - 2				
	M D A				
	C o - 6 0	< 2 . 7 8 5 E + 0 0	< 3 . 0 8 8 E + 0 0	< 1 . 7 8 4 E + 0 0	< 1 . 4 8 9 E + 0 0
	+ / - 2				
	M D A				
S a m p l e D a t e :		1 Q 0 3	2 Q 0 3		
R a d i o n u c l i d e s :	S r - 8 9	3 . 0 7 E + 0 0	8 . 0 4 E - 0 1		
	+ / - 2	5 . 7 0 E + 0 0	1 . 9 0 E + 0 0		
	M D A	5 . 7 6 E + 0 0	2 . 5 6 E + 0 0		
	S r - 9 0	1 . 0 4 E + 0 0	1 . 1 3 E - 0 1		
	+ / - 2	7 . 3 0 E - 0 1	3 . 7 0 E - 0 1		
	M D A	1 . 1 1 E + 0 0	8 . 5 0 E - 0 1		

1. "<" is less than.
2. #10 dairy is an SRS perimeter location.
3. 2Q 03 is second quarter of 2003.
4. Detects are in bold.
5. "+/-2" is plus or minus two standard deviations.

Radiological Monitoring of Dairy Milk, 2003

Cow Milk

	3.27 E + 02	< 252	< 252	< 236
	1.30 E + 02			
	2.11 E + 02			
I - 131	< 85.04	< 7.470 E + 01	< 7.441 E + 01	< 8.995 E + 00
+/-2				
M D A				
Cs - 137	< 2.7	< 2.699 E + 00	< 2.117 E + 00	< 1.544 E + 00
+/-2				
M D A				
Co - 60	< 2.923	< 2.901 E + 00	< 1.838 E + 00	< 1.640 E + 00
+/-2				
M D A				
Sample Date:	1 Q 03	2 Q 03		
Radionuclides:	Sr - 89	2.82 E + 00	-2.96 E + 00	
	+/-2	7.70 E + 00	3.10 E + 00	
	M D A	8.47 E + 00	3.39 E + 00	
	Sr - 90	8.35 E -01	8.13 E -01	
	+/-2	6.30 E -01	5.10 E -01	
	M D A	1.01 E + 00	9.74 E -01	

1. "<" is less than.
2. #14 is an SRS perimeter location.
3. 1Q 03 is first quarter of 2003.
4. Detects are in bold.
5. "+/-2" is plus or minus two standard deviations.

		# 17		
Sample Location:	Denmark	1/30/03	5/8/03	8/12/03
Sample Date:				10/13/03
Radionuclides:	Tritium	< 210	< 251	< 252
	+/-2			< 236
	L L D			
I - 131	< 8.439 E + 01	< 7.573 E + 01	< 7.827 E + 01	< 6.441 E + 00
+/-2				
M D A				
Cs - 137	< 2.695	< 2.698 E + 00	< 2.135 E + 00	< 1.396 E + 00
+/-2				
M D A				
Co - 60	< 2.905	< 2.768 E + 00	< 1.990 E + 00	< 1.408 E + 00
+/-2				
M D A				
Sample Date:	1 Q 03	2 Q 03		
Radionuclides:	Sr - 89	-2.54 E + 00	-8.49 E + 00	
	+/-2	8.70 E + 00	3.20 E + 00	
	M D A	8.66 E + 00	3.26 E + 00	
	Sr - 90	1.30 E + 00	1.13 E + 00	
	+/-2	7.60 E -01	5.40 E -01	
	M D A	1.16 E + 00	9.12 E -01	

1. "<" is less than.
2. #17 is an perimeter location.
3. 1Q 03 is first quarter 2003.
4. Detects are in bold.
5. "+/-2" is plus or minus two standard deviations.

Radiological Monitoring of Dairy Milk, 2003

Cow Milk

Sample Location: Govan		# 22			
Sample Date:		2/14/03	6/25/03	8/14/03	10/15/03
Radionuclides:	Tritium	< 212	< 241	< 252	< 236
	+/-2				
	LLD				
	I-131	< 25.4	< 1.302E+01	< 4.399E+01	< 8.122E+00
	+/-2				
	MDA				
	Cs-137	< 2.694	< 2.555E+00	< 2.089E+00	< 1.629E+00
	+/-2				
	MDA				
	Co-60	< 2.784	< 2.691E+00	< 1.971E+00	< 1.456E+00
	+/-2				
	MDA				
Sample Date:		1Q 03	2Q 03		
Radionuclides:	Sr-89	6.94E-01	NS		
	+/-2	5.80E+00			
	MDA	7.36E+00			
	Sr-90	5.16E-01	NS		
	+/-2	5.90E-01			
	MDA	1.12E+00			

1. NS = No Sample
2. "<" is less than.
3. #22 is an SRS perimeter location.
4. 1Q 03 is first quarter 2003.
5. "+/-2" is plus or minus two standard deviations.

Sample Location: Bowman		# 30			
Sample Date:		1/30/03	6/25/03	8/14/03	10/15/03
Radionuclides:	Tritium	< 212	< 240	< 253	< 237
	+/-2				
	LLD				
	I-131	< 86.66	< 1.635E+01	< 3.710E+01	< 9.049E+00
	+/-2				
	MDA				
	Cs-137	< 2.693	< 2.892E+00	< 2.058E+00	< 1.643E+00
	+/-2				
	MDA				
	Co-60	< 2.626	< 3.062E+00	< 1.958E+00	< 1.738E+00
	+/-2				
	MDA				
Sample Date:		1Q 03	2Q 03		
Radionuclides:	Sr-89	7.61E+00	NS		
	+/-2	11.00			
	MDA	13.60			
	Sr-90	0.70	NS		
	+/-2	0.87			
	MDA	1.76			

1. NS = No Sample
2. "<" is less than.
3. #30 is an SRS background location.
4. 1Q 03 is first quarter 2003.
5. "+/-2" is plus or minus two standard deviations.

Radiological Monitoring of Dairy Milk, 2003

Cow Milk

Sample Location: Darlington		#99	
Sample Date:		6/24/03	10/15/03
Radionuclides:	Tritium	<242	<239
	+/-2		
	MDA		
	I -131	>8hle	<9.175E+00
	+/-2		
	MDA		
	Cs - 137	<2.203	<1.536E+00
	+/-2		
	MDA		
	Co - 60	<2.070	<1.505E+00
	+/-2		
	MDA		
Sample Date:		1Q03	2Q03
Radionuclides:	Sr - 89	NS	NS
	+/-2		
	MDA		
	Sr - 90	NS	NS
	+/-2		
	MDA		

1. NS = No Sample
2. "<" is less than.
3. #99 is a background location.
4. 1Q03 is first quarter 2003.
5. >8hle means that greater than 8 half-lives have elapsed.
6. "+/-2" is plus or minus two standard deviations.

Radiological Monitoring of Dairy Milk, 2003
Milk Solids From Dairy Cow Milk

Sample Locations:		#8	#10	#14	#17	#22	#30
Sample Date:		10/14/03	10/14/03	10/13/03	10/13/03	10/15/03	10/15/03
Radionuclides: pCi/L	Cs-134	<8.858E-03	<1.002E-02	<6.762E-03	<9.718E-03	<1.195E-02	<1.512E-02
	+/-2						
	MDA						
	Cs-136	<9.746E-02	<1.115E-01	<9.897E-02	<1.838E-01	<2.073E-01	<2.747E-01
	+/-2						
	MDA						
	Cs - 137	<9.967E-03	<1.146E-02	<7.547E-03	<1.027E-02	<1.233E-02	<1.527E-02
	+/-2						
	MDA						

Notes:

1. Dairy #30 is a background location.
2. All other dairies are perimeter locations of less than 50 miles from SRS centerpoint.
3. "<" is less than.
4. Milk solids from each location were composited for analysis.
5. "+/-2" is plus or minus two standard deviations.
6. MDA is minimum detectable activity.

Radiological Monitoring of Dairy Milk, 2003

Goat Milk

		SRS Perimeter							Background	
Locations		1GM	2GM	4GM	4GM	4GM	5GM	3GM	3GM	
Sample Date		3/20/03	3/20/03	3/25/03	6/27/03	8/25/03	3/25/03	3/24/03	8/28/03	
Radionuclides:	Tritium	<248	<248	<249	301E+02	<255	<248	<248	<256	
	+/-2				148E+02					
	MDA				241E+02					
	I-131	IE	IE	IE	IE	<1352	NS	IE	<81.64	
	+/-2									
	MDA									
	Cs-137	IE	IE	IE	IE	614E+00	NS	IE	<266	
	+/-2					278E+00				
	MDA					270E+00				
	Co-60	IE	IE	IE	IE	<2666	NS	IE	<2488	
Radionuclides:	+/-2									
	MDA									
	Sr-89	408E+00	647E+00	232E+00	NS	NS	NS	-370E+00	NS	
	+/-2	1.30E+01	1.60E+00	5.40E+00				200E+01		
	MDA	7.30E+00	494E+00	5.43E+00				9.89E+00		
	Sr-90	674E+00	1.11E+01	1.52E+00	NS	NS	NS	1.10E+01	NS	
Radionuclides:	+/-2	2.40E+00	3.30E+00	9.30E+01				3.90E+00		
	MDA	1.76E+00	1.07E+00	1.33E+00				2.79E+00		
Sample Date		3/20/03	3/20/03	3/25/03				3/24/03		

Notes:

- 1 NS is no sample
- 2 IE is lab error
- 3 '<' is less than
- 4 Bold numbers indicate detections above a minimum detectable activity (MDA)
- 5 '+/-2' is plus or minus two standard deviations

3.4.5 Summary Statistics

Radiological Monitoring of Dairy Milk, 2003

Descriptive Statistics of Milk Detects "Plus" 0.5MDAs "By Location"									
Cow Dairy	#8	#10	#14	#17	#22	#30	#99	Perimeter	Background
pCi/L	Perimeter Location Average						Avg(8-22)	Avg(30,99)	
H-3	ND	ND	174	ND	ND	ND	ND	35	0
I-131	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cs - 137	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co-60	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr - 89	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr - 90	ND	ND	ND	1.22	ND	ND	ND	0.24	0.00
Dairy	#8	#10	#14	#17	#22	#30	#99	Perimeter	Background
pCi/L	Perimeter Location Standard Deviation						Std Dev	Std Dev	
H-3	ND	ND	102	ND	ND	ND	ND	46	0
I-131	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cs-137	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co-60	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr-89	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr-90	ND	ND	ND	0.16	ND	ND	ND	0.07	0.00
Dairy	#8	#10	#14	#17	#22	#30	#99	Perimeter	Background
pCi/L	Perimeter Location Median						Median	Median	
H-3	ND	ND	126	ND	ND	ND	ND	0	0
I-131	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cs-137	ND	ND	ND	ND	ND	ND	ND	ND	ND
Co-60	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr-89	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sr-90	ND	ND	ND	1.22	ND	ND	ND	0.00	0.00
Goat Milk	SRS Perimeter Locations						Bkg	Location Average	
Goat ID	1GM	2GM	4GM	4GM	4GM	5GM	3GM	Perimeter	Background
pCi/L	Average			Std Dev	Median	Average		Average	Average
H-3	ND	ND	184	101	128	ND	ND	46	0
I-131	LE	LE	ND	ND	ND	ND	ND	ND	ND
Cs-137	LE	LE	6.14	*	6.14	ND	ND	1.54	0.00
Co-60	LE	LE	ND	ND	ND	ND	ND	ND	ND
Sr-89	ND	6.47	ND	ND	ND	ND	ND	1.62	0.00
Sr-90	6.74	11.10	1.52	*	1.52	ND	11.00	4.84	11.00

Notes: *ndetect concentrations averaged with detects.

1. ND = no detect/not applicable due to only one detect.

2. LE = lab error Table 2 "Detects Only" Descriptive Statistics

3.5 FFA Oversight Monitoring

3.5.1 Summary

The objectives of the Oversight Monitoring Support Projects were to: conduct document review; establish contacts concerning each sampling activity; acquire, validate, and report discrepancies in data; provide independent oversight of the sampling activities; and conduct split soil sampling. Environmental Surveillance and Oversight Program personnel evaluated a total of two sites in 2003. The sites included the acquisition of split soil samples and the oversight of field activities from selected sample locations. The samples were analyzed for selected Target Analyte List, Target Compound List, and gamma radionuclides.

Observation of sampling activities and the splitting of soil samples was limited to a few locations at each selected Site Evaluation (SE) area: (a) D-Area Unidentified Trash Pile (UTP) and (b) Early Construction and Operations Disposal Site (ECODS) D-1.

Prior to the construction of the Savannah River Site (SRS), D-Area UTP was utilized as a dairy farm/homestead. Afterwards, various SRS waste (i.e., laboratory, glassware, metal scraps, ceramic material, etc.) was received and situated in five distinct piles in D-Area UTP. ECODS D-1 was utilized during the construction and early operation of SRS for disposal of construction debris and other waste material.

A review of the analytical data (Section 3.5.3) revealed several sampling locations with contaminants in excess of the established residential Preliminary Remediation Goals (PRG).

RESULTS AND DISCUSSION

A review of the analytical data revealed several sample results in excess of the PRG: (a) arsenic, (b) chromium, (c) K-40, (d) Pb-212, (e) Pb-214, and (f) Ac-228. Arsenic exceedences were detected in locations UTP-03B, UPT-05B, UTP-07A, UTP-33B, UTP-40A, and UTP-41A. A chromium exceedence was detected in location UTP-03B. K-40 exceedences were detected in locations UTP-05RB, UTP-11RB, UTP-17RB, UTP-24RB, UTP-32RB, UTP-33RB, UTP-40RA, and UTP-41RA. Pb-212 exceedences were detected in locations UTP-05RB, UTP-11RB, UTP-17RB, UTP-24RB, UTP-32RB, UTP-33RB, UTP-40RA, and UTP-41RA. Pb-214 exceedences were detected in locations UTP-05RB, UTP-11RB, UTP-17RB, UTP-24RB, UTP-32RB, UTP-33RB, UTP-40RA, and UTP-41RA. Ac-228 exceedences were detected in locations UTP-05RB, UTP-11RB, UTP-17RB, UTP-24RB, UTP-32RB, UTP-33RB, UTP-40RA, and UTP-41RA.

In comparison to Department of Energy-Savannah River (DOE-SR) findings, SCDHEC results were similar except for Pb-212 (UTP-17RB). As the sampling interval for UTP-17RB ranged from 1-4 feet, the variation in results may be associated with depth of sample collection.

CONCLUSIONS / RECOMMENDATIONS

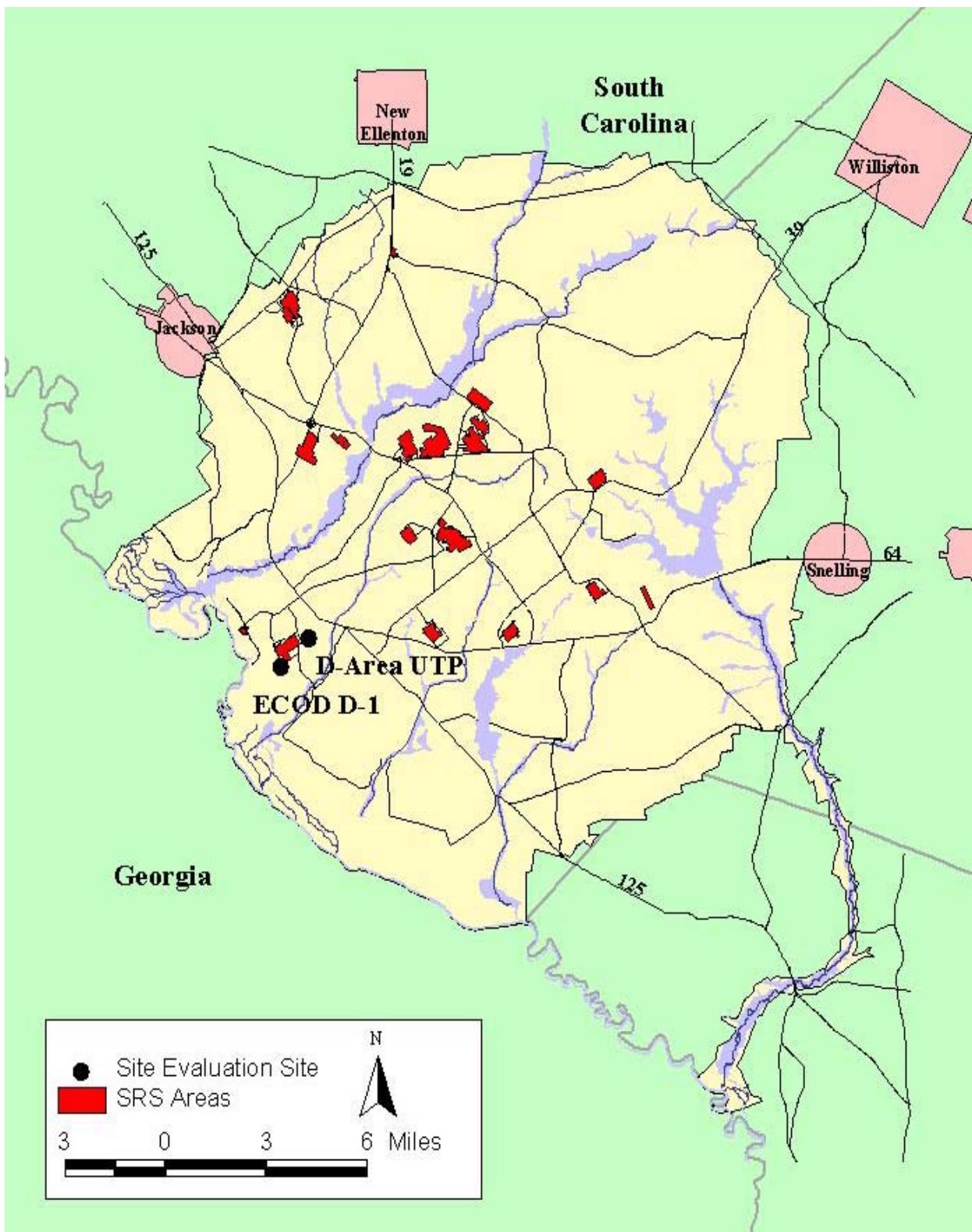
A review of the analytical data revealed several sample results in excess of the PRG. The project attempted to evaluate DOE-SR site evaluation monitoring strategy and procedures,

provide an independent source of information concerning the results of monitoring, and evaluate sampling protocol through observation of sampling for adherence to established DOE-SR standard operating procedures. The results demonstrate that several contaminants exceeded the established residential PRG.

Quality Assurance / Quality Control oversight of DOE-SR contractor pre-characterization sampling activities at selected SE areas will continue as needed. Continued oversight will provide assurance to the public that DOE-SR contractors SE sampling activities adhere to prescribed procedures and independent sampling results are obtained.

3.5.2

Map 10. Oversight Monitoring and Support Locations



3.5.4 Data

FFA Oversight Monitoring and Support Data, 2003

FFA Oversight Monitoring, 2003

D-Area UTP

Sample Dates:		12/9/02	12/9/02	12/9/02	12/11/02	12/11/02
Sample Locations:		UTP-03B	UTP-05B	UTP-07A	UTP-09B	UTP-11B
Analyte (mg/kg)						
	Aldrin	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	alpha-BHC	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	beta-BHC	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Chlordane	<0.015	<0.015	<0.015	<0.015	<0.015
	delta-BHC	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Dieldrin	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan I	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan II	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan Sulfate	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Endrin	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Endrin aldehyde	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Heptachlor	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Heptachlor epoxide	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Lindane	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDD	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDE	<0.0020	<0.0020	0.0027	<0.0020	<0.0020
	p,p'-DDT	<0.0020	<0.0020	0.0024	<0.0020	<0.0020
	PCB 1016	<0.015	<0.015	<0.015	<0.015	<0.015
	PCB 1221	<0.030	<0.030	<0.030	<0.030	<0.030
	PCB 1232	<0.015	<0.015	<0.015	<0.015	<0.015
	PCB 1242	<0.015	<0.015	<0.015	<0.015	<0.015
	PCB 1248	<0.015	<0.015	<0.015	<0.015	<0.015
	PCB 1254	<0.015	<0.015	<0.015	<0.015	<0.015
	PCB 1260	<0.015	<0.015	<0.015	<0.015	<0.015
	Toxaphene	<0.070	<0.070	<0.070	<0.070	<0.070
	1,2,4-trichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30
	1,2-dichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30
	1,3-dichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30
	1,4-dichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30
	2,4,5-trichlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	2,4,6-trichlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	2,4-dichlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	2,4-dimethyl phenol	<0.30	<0.30	<0.30	<0.30	<0.30
	2,4-dinitrotoluene	<0.30	<0.30	<0.30	<0.30	<0.30
	2,6-dinitrotoluene	<0.30	<0.30	<0.30	<0.30	<0.30
	2-chloronaphthalene	<0.30	<0.30	<0.30	<0.30	<0.30
	2-chlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	2-methyl naphthalene	<0.30	<0.30	<0.30	<0.30	<0.30
	2-methyl-4,6-dinitrophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	2-methylphenol	<0.30	<0.30	<0.30	<0.30	<0.30
	2-nitroaniline	<0.30	<0.30	<0.30	<0.30	<0.30
	2-nitrophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	3,3'-dichlorobenzidine	<0.30	<0.30	<0.30	<0.30	<0.30
	3-nitroaniline	<0.30	<0.30	<0.30	<0.30	<0.30
	4-bromophenyl phenyl ether	<0.30	<0.30	<0.30	<0.30	<0.30
	4-chloro-3 methyl phenol	<0.30	<0.30	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003

D-Area UTP

Sample Dates:		12/9/02	12/9/02	12/9/02	12/11/02	12/11/02
Sample Locations:		UTP-03B	UTP-05B	UTP-07A	UTP-09B	UTP-11B
Analyte (mg/kg)						
	4-chloroaniline	<0.30	<0.30	<0.30	<0.30	<0.30
	4-chlorophenyl phenyl ether	<0.30	<0.30	<0.30	<0.30	<0.30
	4-methylphenol	<0.30	<0.30	<0.30	<0.30	<0.30
	4-nitroaniline	<0.30	<0.30	<0.30	<0.30	<0.30
	4-nitrophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	Acenaphthene	<0.30	<0.30	<0.30	<0.30	<0.30
	Acenaphthylene	<0.30	<0.30	<0.30	<0.30	<0.30
	Aniline	<0.30	<0.30	<0.30	<0.30	<0.30
	Anthracene	<0.30	<0.30	<0.30	<0.30	<0.30
	Azobenzene	<0.30	<0.30	<0.30	<0.30	<0.30
	Benzo(a)anthracene	<0.30	<0.30	<0.30	<0.30	<0.30
	Benzo(a)pyrene	<0.30	<0.30	<0.30	<0.30	<0.30
	Benzo(b)fluoranthene	<0.30	<0.30	<0.30	<0.30	<0.30
	Benzo(ghi)perylene	<0.30	<0.30	<0.30	<0.30	<0.30
	Benzo(k)fluoranthene	<0.30	<0.30	<0.30	<0.30	<0.30
	Benzoic acid	<0.30	<0.30	<0.30	<0.30	<0.30
	Benzyl alcohol	<0.30	<0.30	<0.30	<0.30	<0.30
	Bis(2-chloroethoxy)methane	<0.30	<0.30	<0.30	<0.30	<0.30
	Bis(2-chloroethyl)ether	<0.30	<0.30	<0.30	<0.30	<0.30
	Bis(2-chloroisopropyl)ether	<0.30	<0.30	<0.30	<0.30	<0.30
	Bis(2-ethylhexyl)phthalate	<0.30	<0.30	<0.30	<0.30	<0.30
	Butylbenzyl phthalate	<0.30	<0.30	<0.30	<0.30	<0.30
	Chrysene	<0.30	<0.30	<0.30	<0.30	<0.30
	Dibenzo(a,h)anthracene	<0.30	<0.30	<0.30	<0.30	<0.30
	Dibenzofuran	<0.30	<0.30	<0.30	<0.30	<0.30
	Diethyl phthalate	<0.30	<0.30	<0.30	<0.30	<0.30
	Dimethyl phthalate	<0.30	<0.30	<0.30	<0.30	<0.30
	Di-n-butylphthalate	0.78	1	1.2	<0.30	<0.30
	Di-n-octylphthalate	<0.30	<0.30	<0.30	<0.30	<0.30
	Fluoranthene	<0.30	<0.30	<0.30	<0.30	<0.30
	Fluorene	<0.30	<0.30	<0.30	<0.30	<0.30
	Hexachlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30
	Hexachlorobutadiene	<0.30	<0.30	<0.30	<0.30	<0.30
	Hexachlorocyclopentadiene	<0.30	<0.30	<0.30	<0.30	<0.30
	Hexachloroethane	<0.30	<0.30	<0.30	<0.30	<0.30
	Indeno(1,2,3-cd)pyrene	<0.30	<0.30	<0.30	<0.30	<0.30
	Isophorone	<0.30	<0.30	<0.30	<0.30	<0.30
	Naphthalene	<0.30	<0.30	<0.30	<0.30	<0.30
	Nitrobenzene	<0.30	<0.30	<0.30	<0.30	<0.30
	N-nitrosodimethylamine	<0.30	<0.30	<0.30	<0.30	<0.30
	N-nitrosodi-n-propylamine	<0.30	<0.30	<0.30	<0.30	<0.30
	N-nitrosodiphenylamine	<0.30	<0.30	<0.30	<0.30	<0.30
	Pentachlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30
	Phenanthrene	<0.30	<0.30	<0.30	<0.30	<0.30
	Phenol	<0.30	<0.30	<0.30	<0.30	<0.30
	Pyrene	<0.30	<0.30	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003

D-Area UTP

Sample Dates:		12/1/02	12/11/02	12/11/02	12/1/02	12/12/02
Sample Locations:		UTP-15A	UTP-17B	UTP-20B	UTP-21A	UTP-24B
Analyte (mg/kg)	Aldrin	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
alpha-BHC	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
beta-BHC	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Chlordane	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
delta-BHC	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Dieldrin	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Endosulfan I	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Endosulfan II	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Endosulfan Sulfate	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Endrin	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Endrin aldehyde	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Heptachlor	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Heptachlor epoxide	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Lindane	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
p,p'-DDD	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
p,p'-DDE	<0.0020	<0.0020	<0.0020	0.026	<0.0020	
p,p'-DDT	<0.0020	0.014	0.0037	0.014	<0.0020	
PCB 1016	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB 1221	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
PCB 1232	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB 1242	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB 1248	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB 1254	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
PCB 1260	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015
Toxaphene	<0.070	<0.070	<0.070	<0.070	<0.070	<0.070
1,2,4-trichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,2-dichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,3-dichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,4-dichlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4,5-trichlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4,6-trichlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-dichlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-dimethyl phenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,4-dinitrotoluene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2,6-dinitrotoluene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-chloronaphthalene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-chlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-methyl naphthalene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-methyl-4,6-dinitrophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-methylphenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-nitroaniline	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
2-nitrophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
3,3'-dichlorobenzidine	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
3-nitroaniline	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
4-bromophenyl phenyl ether	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
4-chloro-3 methyl phenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003

D-Area UTP

Sample Dates:		12/1/02	12/11/02	12/11/02	12/1/02	12/12/02
Sample Locations:		UTP-15A	UTP-17B	UTP-20B	UTP-21A	UTP-24B
Analyte (mg/kg)	4-chloroaniline	<0.30	<0.30	<0.30	<0.30	<0.30
4-chlorophenyl phenyl ether	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
4-methylphenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
4-nitroaniline	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
4-nitrophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acenaphthene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Acenaphthylene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Aniline	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Anthracene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Azobenzene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzo(a)anthracene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzo(a)pyrene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzo(b)fluoranthene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzo(ghi)perylene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzo(k)fluoranthene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzoic acid	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Benzyl alcohol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Bis(2-chloroethoxy)methane	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Bis(2-chloroethyl)ether	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Bis(2-chloroisopropyl)ether	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Bis(2-ethylhexyl)phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Butylbenzyl phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Chrysene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dibenzo(a,h)anthracene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dibenzofuran	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Diethyl phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Dimethyl phthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Di-n-butylphthalate	<0.30	<0.30	0.63	0.9	<0.30	<0.30
Di-n-octylphthalate	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Fluoranthene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Fluorene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Hexachlorobenzene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Hexachlorobutadiene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Hexachlorocyclopentadiene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Hexachloroethane	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Indeno(1,2,3-cd)pyrene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Isophorone	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Naphthalene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Nitrobenzene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
N-nitrosodimethylamine	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
N-nitrosodi-n-propylamine	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
N-nitrosodiphenylamine	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Pentachlorophenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Phenanthrene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Phenol	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Pyrene	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003

D-Area UTP

Sample Dates:		12/12/02	12/12/02	12/12/02	12/12/02
Sample Locations:		UTP-32B	UTP-33B	UTP-40A	UTP-41A
Analyte (mg/kg)					
	Aldrin	<0.0020	<0.0020	<0.0020	<0.0020
	alpha-BHC	<0.0020	<0.0020	<0.0020	<0.0020
	beta-BHC	<0.0020	<0.0020	<0.0020	<0.0020
	Chlordane	<0.015	<0.015	<0.015	<0.015
	delta-BHC	<0.0020	<0.0020	<0.0020	<0.0020
	Dieldrin	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan I	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan II	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan Sulfate	<0.0020	<0.0020	<0.0020	<0.0020
	Endrin	<0.0020	<0.0020	<0.0020	<0.0020
	Endrin aldehyde	<0.0020	<0.0020	<0.0020	<0.0020
	Heptachlor	<0.0020	<0.0020	<0.0020	<0.0020
	Heptachlor epoxide	<0.0020	<0.0020	<0.0020	<0.0020
	Lindane	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDD	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDE	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDT	<0.0020	<0.0020	<0.0020	<0.0020
	PCB 1016	<0.015	<0.015	<0.015	<0.015
	PCB 1221	<0.030	<0.030	<0.030	<0.030
	PCB 1232	<0.015	<0.015	<0.015	<0.015
	PCB 1242	<0.015	<0.015	<0.015	<0.015
	PCB 1248	<0.015	<0.015	<0.015	<0.015
	PCB 1254	<0.015	<0.015	<0.015	<0.015
	PCB 1260	<0.015	<0.015	<0.015	<0.015
	Toxaphene	<0.070	<0.070	<0.070	<0.070
	1,2,4-trichlorobenzene	<0.30	<0.30	<0.30	<0.30
	1,2-dichlorobenzene	<0.30	<0.30	<0.30	<0.30
	1,3-dichlorobenzene	<0.30	<0.30	<0.30	<0.30
	1,4-dichlorobenzene	<0.30	<0.30	<0.30	<0.30
	2,4,5-trichlorophenol	<0.30	<0.30	<0.30	<0.30
	2,4,6-trichlorophenol	<0.30	<0.30	<0.30	<0.30
	2,4-dichlorophenol	<0.30	<0.30	<0.30	<0.30
	2,4-dimethyl phenol	<0.30	<0.30	<0.30	<0.30
	2,4-dinitrotoluene	<0.30	<0.30	<0.30	<0.30
	2,6-dinitrotoluene	<0.30	<0.30	<0.30	<0.30
	2-chloronaphthalene	<0.30	<0.30	<0.30	<0.30
	2-chlorophenol	<0.30	<0.30	<0.30	<0.30
	2-methyl naphthalene	<0.30	<0.30	<0.30	<0.30
	2-methyl-4,6-dinitrophenol	<0.30	<0.30	<0.30	<0.30
	2-methylphenol	<0.30	<0.30	<0.30	<0.30
	2-nitroaniline	<0.30	<0.30	<0.30	<0.30
	2-nitrophenol	<0.30	<0.30	<0.30	<0.30
	3,3'-dichlorobenzidine	<0.30	<0.30	<0.30	<0.30
	3-nitroaniline	<0.30	<0.30	<0.30	<0.30
	4-bromophenyl phenyl ether	<0.30	<0.30	<0.30	<0.30
	4-chloro-3 methyl phenol	<0.30	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003

D-Area UTP

Sample Dates:		12/12/02	12/12/02	12/12/02	12/12/02
Sample Locations:		UTP-32B	UTP-33B	UTP-40A	UTP-41A
Analyte (mg/kg)					
	Aldrin	<0.0020	<0.0020	<0.0020	<0.0020
	alpha-BHC	<0.0020	<0.0020	<0.0020	<0.0020
	beta-BHC	<0.0020	<0.0020	<0.0020	<0.0020
	Chlordane	<0.015	<0.015	<0.015	<0.015
	delta-BHC	<0.0020	<0.0020	<0.0020	<0.0020
	Dieldrin	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan I	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan II	<0.0020	<0.0020	<0.0020	<0.0020
	Endosulfan Sulfate	<0.0020	<0.0020	<0.0020	<0.0020
	Endrin	<0.0020	<0.0020	<0.0020	<0.0020
	Endrin aldehyde	<0.0020	<0.0020	<0.0020	<0.0020
	Heptachlor	<0.0020	<0.0020	<0.0020	<0.0020
	Heptachlor epoxide	<0.0020	<0.0020	<0.0020	<0.0020
	Lindane	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDD	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDE	<0.0020	<0.0020	<0.0020	<0.0020
	p,p'-DDT	<0.0020	<0.0020	<0.0020	<0.0020
	PCB 1016	<0.015	<0.015	<0.015	<0.015
	PCB 1221	<0.030	<0.030	<0.030	<0.030
	PCB 1232	<0.015	<0.015	<0.015	<0.015
	PCB 1242	<0.015	<0.015	<0.015	<0.015
	PCB 1248	<0.015	<0.015	<0.015	<0.015
	PCB 1254	<0.015	<0.015	<0.015	<0.015
	PCB 1260	<0.015	<0.015	<0.015	<0.015
	Toxaphene	<0.070	<0.070	<0.070	<0.070
	1,2,4-trichlorobenzene	<0.30	<0.30	<0.30	<0.30
	1,2-dichlorobenzene	<0.30	<0.30	<0.30	<0.30
	1,3-dichlorobenzene	<0.30	<0.30	<0.30	<0.30
	1,4-dichlorobenzene	<0.30	<0.30	<0.30	<0.30
	2,4,5-trichlorophenol	<0.30	<0.30	<0.30	<0.30
	2,4,6-trichlorophenol	<0.30	<0.30	<0.30	<0.30
	2,4-dichlorophenol	<0.30	<0.30	<0.30	<0.30
	2,4-dimethyl phenol	<0.30	<0.30	<0.30	<0.30
	2,4-dinitrotoluene	<0.30	<0.30	<0.30	<0.30
	2,6-dinitrotoluene	<0.30	<0.30	<0.30	<0.30
	2-chloronaphthalene	<0.30	<0.30	<0.30	<0.30
	2-chlorophenol	<0.30	<0.30	<0.30	<0.30
	2-methyl naphthalene	<0.30	<0.30	<0.30	<0.30
	2-methyl-4,6-dinitrophenol	<0.30	<0.30	<0.30	<0.30
	2-methylphenol	<0.30	<0.30	<0.30	<0.30
	2-nitroaniline	<0.30	<0.30	<0.30	<0.30
	2-nitrophenol	<0.30	<0.30	<0.30	<0.30
	3,3'-dichlorobenzidine	<0.30	<0.30	<0.30	<0.30
	3-nitroaniline	<0.30	<0.30	<0.30	<0.30
	4-bromophenyl phenyl ether	<0.30	<0.30	<0.30	<0.30
	4-chloro-3 methyl phenol	<0.30	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003**D-Area UTP**

Sample Dates:		12/09/02	12/9/02	12/9/02	12/11/02	12/11/02
Sample		UTP-03B	UTP-05B	UTP-07A	UTP-09B	UTP-11B
Analyte (mg/kg)	Aluminum	5300	4300	2900	4700	7600
Antimony	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	24	20	25	24	26	
Beryllium	<0.30	<0.30	<0.30	<0.30	0.3	
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0	
Calcium	30	350	320	260	240	
Chromium	240	2	1.2	2.1	3.8	
Cobalt	<2.0	<2.0	<2.0	<2.0	<2.0	
Copper	22	2	6.8	2.1	3.4	
Iron	4700	3100	1100	3200	4600	
Lead	<5.0	<5.0	<5.0	<5.0	<5.0	
Magnesium	150	140	100	190	340	
Manganese	18	86	260	78	94	
Nickel	2.7	<2.0	<2.0	<2.0	3.4	
Potassium	140	100	<100	110	170	
Selenium	<10	<10	<10	<10	<10	
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	
Sodium	<10	19	36	<10	<10	
Thallium	<50	<50	<50	<50	<50	
Vanadium	4.9	3.6	<2.0	3.7	5.5	
Zinc	8.6	7.2	9.4	4.3	7.6	
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	
Cyanide	<10	<10	<10	<10	<10	

FFA Oversight Monitoring, 2003**D-Area UTP**

Sample Dates:		12/11/02	12/11/02	12/11/02	12/11/02	12/12/02
Sample		UTP-15A	UTP-17B	UTP-20B	UTP-21A	UTP-24B
Analyte (mg/kg)	Aluminum	3300	4700	3600	7000	2800
Antimony	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10	<10
Barium	49	20	19	49	9.2	
Beryllium	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cadmium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Calcium	250	120	160	190	140	
Chromium	<1.0	2.3	3.6	4.8	2.5	
Cobalt	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Copper	2.3	2.2	16	10	14	
Iron	1000	2900	2000	2700	1400	
Lead	<5.0	<5.0	<5.0	6.8	<5.0	
Magnesium	91	280	210	220	130	
Manganese	330	40	48	410	14	
Nickel	<2.0	2.1	2.7	3.1	6.2	
Potassium	<100	120	<100	170	<100	
Selenium	<10	<10	<10	<10	<10	<10
Silver	<3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Sodium	<10	<10	18	<10	160	
Thallium	<50	<50	<50	<50	<50	<50
Vanadium	<2.0	4	2	3.8	2.8	
Zinc	5.6	5.8	12	20	36	
Mercury	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25

FFA Oversight Monitoring, 2003**D-Area UTP**

Sample Dates:		12/12/02	12/12/02	12/12/02	12/12/02
Sample		UTP-32B	UTP-33B	UTP-40A	UTP-41A
Analyte (mg/kg)	Aluminum	2500	4000	2600	3200
Antimony	<5.0	<5.0	<5.0	<5.0	<5.0
Arsenic	<10	<10	<10	<10	<10
Barium	9.5	20	19	20	
Beryllium	<0.30	<0.30	<0.30	<0.30	
Cadmium	<1.0	<1.0	<1.0	<1.0	
Calcium	140	61	63	130	
Chromium	1.4	2.3	2.2	4.4	
Cobalt	<2.0	<2.0	<2.0	<2.0	
Copper	1.1	20	16	38	
Iron	1200	2200	1100	1600	
Lead	<5.0	<5.0	<5.0	<5.0	
Magnesium	150	170	100	160	
Manganese	5.2	19	16	43	
Nickel	<2.0	4.5	<2.0	2.9	
Potassium	<100	130	<100	<100	
Selenium	<10	<10	<10	<10	
Silver	<3.0	<3.0	<3.0	<3.0	
Sodium	230	180	160	<10	
Thallium	<50	<50	<50	<50	
Vanadium	2.5	4.4	2.3	<2.0	
Zinc	5.5	26	39	28	
Mercury	<0.25	<0.25	<0.25	<0.25	
Cyanide	<10	<10	<10	<10	

FFA Oversight Monitoring, 2003

D-Area UTP

Sample Dates:		12/12/02	12/12/02	12/12/02	12/12/02
Sample Locations:		UTP-32RB	UTP-33RB	UTP-40RA	UTP-41RA
Radionuclide (pCi/g)	Be-7	<7.788E-02	<7.765E-02	<7.667E-02	<8.299E-02
	Na-22	<6.238E-03	<6.357E-03	<6.758E-03	<7.147E-03
	K-40	6.52E-01	8.13E-01	5.92E-01	9.02E-01
	(+/-2sig)	1.17E-01	1.31E-01	1.23E-01	1.41E-01
	Mn-54	<7.644E-03	<7.208E-03	<7.660E-03	<7.520E-03
	Co-58	<7.982E-03	<7.457E-03	<8.211E-03	<8.259E-03
	Co-60	<6.424E-03	<6.600E-03	<6.227E-03	<6.531E-03
	Zn-65	<1.540E-02	<1.519E-02	<1.476E-02	<1.630E-02
	Y-88	<6.696E-03	<6.762E-03	<6.626E-03	<7.539E-03
	Zr-95	<1.535E-02	<1.653E-02	<1.530E-02	<1.632E-02
	Ru-103	<1.014E-02	<1.016E-02	<1.065E-02	<1.153E-02
	Sb-125	<1.872E-02	<1.958E-02	<2.066E-02	<2.015E-02
	I-131	<7.717E-02	<8.556E-02	<9.347E-02	<9.378E-02
	Cs-134	<7.793E-03	<7.488E-03	<7.179E-03	<7.573E-03
	Cs-137	<7.064E-03	<7.642E-03	<7.804E-03	<7.747E-03
	Ce-144	<6.258E-02	<6.209E-02	<6.329E-02	<6.541E-02
	Eu-152	<2.157E-02	<2.195E-02	<2.241E-02	<2.294E-02
	Eu-154	<1.512E-02	<1.551E-02	<1.593E-02	<1.667E-02
	Eu-155	<3.038E-02	7.16E-02	<3.231E-02	<3.315E-02
	(+/-2sig)		2.29E-02		
	Pb-212	3.59E-01	3.70E-01	3.54E-01	3.47E-01
	(+/-2sig)	1.65E-01	1.66E-01	4.63E-02	4.59E-02
	Pb-214	2.31E-01	3.48E-01	2.63E-01	2.93E-01
	(+/-2sig)	2.49E-02	3.13E-02	2.62E-02	2.90E-02
	Ra-226	5.89E-01	5.85E-01	6.56E-01	4.39E-01
	(+/-2sig)	2.72E-01	2.12E-01	1.96E-01	2.00E-01
	Ac-228	2.94E-01	2.92E-01	3.38E-01	3.42E-01
	(+/-2sig)	2.99E-02	2.86E-02	3.07E-02	3.18E-02
	Th-234	<1.492E-01	<1.461E-01	4.73E-01	<1.540E-01
	(+/-2sig)			1.69E-01	
	Am-241	<4.152E-02	<4.086E-02	<4.213E-02	<4.325E-02

FFA Oversight Monitoring, 2003**D-Area UTP**

Sample Dates:		12/9/2002	12/11/2002	12/11/2002	12/12/2002
Sample Locations:		UTP-05RB	UTP-11RB	UTP-17RB	UTP-24RB
Radionuclide (pCi/g)	Be-7	<8.680E-02	<9.546E-02	<7.770E-02	<7.073E-02
	Na-22	<6.315E-03	<9.717E-03	<6.350E-03	<6.320E-03
	K-40	9.85E-01	1.21E+00	9.57E-01	6.37E-01
	(+-2sig)	1.58E-01	1.74E-01	1.53E-01	1.26E-01
	Mn-54	<7.302E-03	<8.525E-03	<7.803E-03	<6.087E-03
	Co-58	<8.457E-03	<9.961E-03	<8.012E-03	<7.352E-03
	Co-60	<7.049E-03	<7.319E-03	<6.887E-03	<6.154E-03
	Zn-65	<1.663E-02	<1.831E-02	<1.582E-02	<1.392E-02
	Y-88	<7.560E-03	<7.934E-03	<7.111E-03	<5.897E-03
	Zr-95	<1.703E-02	<1.985E-02	<1.522E-02	<1.400E-02
	Ru-103	<1.161E-02	<1.297E-02	<1.053E-02	<9.742E-03
	Sb-125	<2.195E-02	<2.389E-02	<2.040E-02	<1.949E-02
	I-131	<9.573E-02	<1.307E-01	<8.559E-02	<7.106E-02
	Cs-134	<8.015E-03	<9.177E-03	<7.629E-03	<7.262E-03
	Cs-137	<8.052E-03	<8.043E-03	<7.044E-03	<6.735E-03
	Ce-144	<7.235E-02	<7.489E-02	<6.528E-02	<5.851E-02
	Eu-152	<2.466E-02	<2.665E-02	<2.303E-02	<2.178E-02
	Eu-154	<1.733E-02	<1.887E-02	<1.597E-02	<1.542E-02
	Eu-155	<2.904E-02	<3.036E-02	<3.308E-02	<3.079E-02
	Pb-212	4.23E-01	4.75E-01	<1.442E-02	3.13E-01
	(+-2sig)	5.51E-02	6.15E-02		4.13E-02
	Pb-214	3.23E-01	5.13E-01	3.18E-01	2.60E-01
	(+-2sig)	2.99E-02	4.28E-02	3.21E-02	2.71E-02
	Ra-226	7.35E-01	6.74E-01	6.47E-01	5.01E-01
	(+-2sig)	2.45E-01	2.47E-01	2.24E-02	1.98E-01
	Ac-228	4.40E-01	4.68E-01	3.87E-01	3.06E-01
	(+-2sig)	3.56E-02	3.91E-02	3.30E-02	2.85E-02
	Th-234	5.01E-01	5.23E-01	<1.469E-01	4.39E-01
	(+-2sig)	1.91E-01	1.98E-01		1.61E-01
	Am-241	<4.591E-02	<4.883E-02	<4.361E-02	<3.925E-02

FFA Oversight Monitoring, 2003

ECOD D-1		3/4/2003	3/4/2003	3/4/2003
Sample Dates:		ED-1B	ED-3C	ED-5B
Sample Locations:				
Analyte (mg/kg)				
	Aldrin	<0.0020	<0.0020	<0.0020
	alpha-BHC	<0.0020	<0.0020	<0.0020
	beta-BHC	<0.0020	<0.0020	<0.0020
	Chlordane	<0.015	<0.015	<0.015
	delta-BHC	<0.0020	<0.0020	<0.0020
	Dieldrin	<0.0020	<0.0020	<0.0020
	Endosulfan I	<0.0020	<0.0020	<0.0020
	Endosulfan II	<0.0020	<0.0020	<0.0020
	Endosulfan Sulfate	<0.0020	<0.0020	<0.0020
	Endrin	<0.0020	<0.0020	<0.0020
	Endrin aldehyde	<0.0020	<0.0020	<0.0020
	Heptachlor	<0.0020	<0.0020	<0.0020
	Heptachlor epoxide	<0.0020	<0.0020	<0.0020
	Lindane	<0.0020	<0.0020	<0.0020
	p,p'-DDD	<0.0020	<0.0020	<0.0020
	p,p'-DDE	<0.0020	<0.0020	<0.0020
	p,p'-DDT	<0.0020	<0.0020	<0.0020
	PCB 1016	<0.015	<0.015	<0.015
	PCB 1221	<0.030	<0.030	<0.030
	PCB 1232	<0.015	<0.015	<0.015
	PCB 1242	<0.015	<0.015	<0.015
	PCB 1248	<0.015	<0.015	<0.015
	PCB 1254	<0.015	<0.015	<0.015
	PCB 1260	<0.015	<0.015	<0.015
	Toxaphene	<0.070	<0.070	<0.070
	1,2,4-trichlorobenzene	<0.30	<0.30	<0.30
	1,2-dichlorobenzene	<0.30	<0.30	<0.30
	1,3-dichlorobenzene	<0.30	<0.30	<0.30
	1,4-dichlorobenzene	<0.30	<0.30	<0.30
	2,4,5-trichlorophenol	<0.30	<0.30	<0.30
	2,4,6-trichlorophenol	<0.30	<0.30	<0.30
	2,4-dichlorophenol	<0.30	<0.30	<0.30
	2,4-dimethyl phenol	<0.30	<0.30	<0.30
	2,4-dinitrotoluene	<0.30	<0.30	<0.30
	2,6-dinitrotoluene	<0.30	<0.30	<0.30
	2-chloronaphthalene	<0.30	<0.30	<0.30
	2-chlorophenol	<0.30	<0.30	<0.30
	2-methyl naphthalene	<0.30	<0.30	<0.30
	2-methyl-4,6-dinitrophenol	<0.30	<0.30	<0.30
	2-methylphenol	<0.30	<0.30	<0.30
	2-nitroaniline	<0.30	<0.30	<0.30
	2-nitrophenol	<0.30	<0.30	<0.30
	3,3'-dichlorobenzidine	<0.30	<0.30	<0.30
	3-nitroaniline	<0.30	<0.30	<0.30
	4-bromophenyl phenyl ether	<0.30	<0.30	<0.30
	4-chloro-3 methyl phenol	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003

ECOD D-1		3/4/2003	3/4/2003	3/4/2003
Sample Dates:		3/4/2003	3/4/2003	3/4/2003
Sample Locations:		ED-1B	ED-3C	ED-5B
Analyte (mg/kg)	4-chloroaniline	<0.30	<0.30	<0.30
	4-chlorophenyl phenyl ether	<0.30	<0.30	<0.30
	4-methylphenol	<0.30	<0.30	<0.30
	4-nitroaniline	<0.30	<0.30	<0.30
	4-nitrophenol	<0.30	<0.30	<0.30
	Acenaphthene	<0.30	<0.30	<0.30
	Acenaphthylene	<0.30	<0.30	<0.30
	Aniline	<0.30	<0.30	<0.30
	Anthracene	<0.30	<0.30	<0.30
	Azobenzene	<0.30	<0.30	<0.30
	Benzo(a)anthracene	<0.30	<0.30	<0.30
	Benzo(a)pyrene	<0.30	<0.30	<0.30
	Benzo(b)fluoranthene	<0.30	<0.30	<0.30
	Benzo(ghi)perylene	<0.30	<0.30	<0.30
	Benzo(k)fluoranthene	<0.30	<0.30	<0.30
	Benzoic acid	<0.30	<0.30	<0.30
	Benzyl alcohol	<0.30	<0.30	<0.30
	Bis(2-chloroethoxy)methane	<0.30	<0.30	<0.30
	Bis(2-chloroethyl)ether	<0.30	<0.30	<0.30
	Bis(2-chloroisopropyl)ether	<0.30	<0.30	<0.30
	Bis(2-ethylhexyl)phthalate	<0.30	<0.30	<0.30
	Butylbenzyl phthalate	<0.30	<0.30	<0.30
	Chrysene	<0.30	<0.30	<0.30
	Dibenzo(a,h)anthracene	<0.30	<0.30	<0.30
	Dibenzofuran	<0.30	<0.30	<0.30
	Diethyl phthalate	<0.30	<0.30	<0.30
	Dimethyl phthalate	<0.30	<0.30	<0.30
	Di-n-butylphthalate	<0.30	<0.30	<0.30
	Di-n-octylphthalate	<0.30	<0.30	<0.30
	Fluoranthene	<0.30	<0.30	<0.30
	Fluorene	<0.30	<0.30	<0.30
	Hexachlorobenzene	<0.30	<0.30	<0.30
	Hexachlorobutadiene	<0.30	<0.30	<0.30
	Hexachlorocyclopentadiene	<0.30	<0.30	<0.30
	Hexachloroethane	<0.30	<0.30	<0.30
	Indeno(1,2,3-cd)pyrene	<0.30	<0.30	<0.30
	Isophorone	<0.30	<0.30	<0.30
	Naphthalene	<0.30	<0.30	<0.30
	Nitrobenzene	<0.30	<0.30	<0.30
	N-nitrosodimethylamine	<0.30	<0.30	<0.30
	N-nitrosodi-n-propylamine	<0.30	<0.30	<0.30
	N-nitrosodiphenylamine	<0.30	<0.30	<0.30
	Pentachlorophenol	<0.30	<0.30	<0.30
	Phenanthrene	<0.30	<0.30	<0.30
	Phenol	<0.30	<0.30	<0.30
	Pyrene	<0.30	<0.30	<0.30

FFA Oversight Monitoring, 2003

ECOD D-1				
Sample Dates:		3/4/2003	3/4/2003	3/4/2003
Sample Locations:		ED-1B	ED-3C	ED-5B
Analyte (mg/kg)	Aluminum	9600	5600	6600
	Antimony	<5.0	<5.0	<5.0
	Arsenic	<10	<10	<10
	Barium	50	20	91
	Beryllium	0.91	<0.30	0.31
	Cadmium	4.6	2	2.2
	Calcium	1000	170	200
	Chromium	24	16	20
	Cobalt	<2.0	<2.0	<2.0
	Copper	24	2	3.8
	Iron	31000	14000	15000
	Lead	14	<5.0	11
	Magnesium	230	260	370
	Manganese	150	<1.0	16
	Nickel	2.7	<2.0	<2.0
	Potassium	240	140	220
	Selenium	<10	<10	<10
	Silver	<3.0	<3.0	<3.0
	Sodium	<10.0	<10.0	<10.0
	Thallium	<50	<50	<50
	Vanadium	47	23	41
	Zinc	17	2.6	5.2
	Mercury	<0.25	<0.25	<0.25
	Cyanide	<10	<10	<10

4.1 Radiological Fish Monitoring Associated With SRS

4.1.1 Summary

The South Carolina Department of Health and Environmental Control (SCDHEC) conducts fish monitoring for radionuclide activity in an effort to determine the magnitude, extent, and trends of radionuclide levels. Five largemouth bass (*Micropterus salmoides*) and five catfish (*Ameiurus catus*, *Ictalurus furcatus*, or *Ictalurus punctatus*) were collected from each of 10 sample locations. Studies have shown that these species bioaccumulate measurable amounts of radionuclides. Spotted sucker (*Mylorema melanops*) were collected from seven locations as part of an ongoing effort to sample additional species each study year.

Fish were collected using boat mounted electrofishing equipment. Samples were collected at five stations where creeks from the Savannah River Site (SRS) meet the Savannah River. In addition, samples were collected at one Savannah River station upstream of the SRS, two stations downstream of the SRS, and two background locations. All fish were composited by species and sample location, and separated into edible and nonedible homogeneous portions. Edible composites were analyzed for gamma-emitting isotopes and tritium. Nonedible composites were analyzed for gamma-emitters and strontium.

RESULTS AND DISCUSSION

Fish collections were conducted from April 15 through August 19, 2003. Largemouth bass were collected for the predator ecological finfish type. Channel or white catfish were collected for the bottom-feeders ecological finfish type. Harvesting channel or white catfish was unsuccessful at the Congaree location; blue catfish were substituted to report a bottom-feeder representative of the area. Spotted sucker were collected at seven locations on the Savannah River.

A total of 126 fish was collected. Fifty-four composites and six individual fish samples were processed in the Edisto Savannah District (ESD) laboratory. These samples were sent to the Radiological Environmental Monitoring Division (REMD) for radiological analysis of gamma-emitting radionuclides. Portions of the samples were sent to STL for strontium analysis. The Edisto Savannah District tritium laboratory analyzed aliquots from all edible samples. Activity levels of radionuclides and ESOP historical data from 1999 – 2003 are reported in section 4.1.4.

Tritium

Activity levels of tritium were analyzed in 27 edible portions of bass, catfish, and spotted sucker composites and three individual samples. The Stevens Creek and Congaree River background locations were the only sampling areas that did not produce detectable tritium activity in any samples (Figure 1a, section 4.1.3). The Stevens Creek station is located above a spillway for a hydroelectric generating plant, which completely blocks movement of fish from the lower Savannah River.

Seven of eight bass samples from the Savannah River produced detectable tritium activity, with a mean of 747 pCi/L. The composite from the Four Mile Creek location had the highest reported tritium activity, 2621 pCi/L.

Six of eight Savannah River catfish samples exhibited tritium activity, with a mean of 294 pCi/L. The highest tritium level observed in the catfish composites, 583 pCi/L, was from the Steel Creek location.

All seven spotted sucker samples showed tritium activity, ranging from 247 to 902 pCi/L, with a mean of 566 pCi/L. The highest tritium level observed in the sucker composites was also from the Steel Creek location.

With the exception of the Four Mile Creek bass, samples from downstream of SRS exhibited tritium activities similar to samples collected near SRS streams. In general, 2003 data was consistent with ESOP historically reported data (Figures 1b,1c, section 4.1.3).

Cesium

Activity levels of cesium-137 (Cs-137) were analyzed in 54 edible and nonedible portions of bass, catfish, and spotted sucker composites and six individual samples. The two background locations, Stevens Creek and Congaree River, were the only locations where Cs-137 was not detected in any sample (Figure 2a/3a, section 4.1.3). Consistent with historically reported ESOP data, higher levels of Cs-137 were reported at the locations adjacent to the SRS (Figure 2b,2c/3b,3c, section 4.1.3).

All edible bass composites from Savannah River locations produced detectable levels of Cs-137, ranging from 0.043 to 0.367 pCi/g, with a mean of 0.106 pCi/g. The sample from the Four Mile Creek location had the highest reported activity level. Cs-137 levels reported above 0.04 pCi/g were observed in all edible bass composites from the five locations adjacent to the SRS. Levels for edible bass at the Hwy. 301 Bridge area and Stokes Bluff Landing locations downstream of SRS were reported above 0.05 pCi/g fresh weight. Cs-137 activity in nonedible bass composites was detected only from four creek mouth locations adjacent to SRS.

From the Beaver Dam Creek location downstream to the Hwy. 301 bridge area, edible catfish composites from Savannah River locations produced detectable levels of Cs-137, although activities were generally lower than in bass samples. The Cs-137 levels in these catfish composites ranged from 0.041 to 0.114 pCi/g. Only three nonedible composites produced detectable Cs-137 activity. The Steel Creek location produced the highest activities for both the edible and nonedible samples.

Spotted sucker samples produced detectable Cs-137 activity from four of the seven stations sampled, two adjacent to SRS and both stations downstream of SRS (Figure 4, section 4.1.3). The highest was in an edible composite from the Four Mile Creek location.

Strontium

Portions of 25 nonedible composites were selected for strontium analysis in 2003. Seventeen samples exhibited activity greater than the Minimum Detectable Activity (MDA), ranging from 0.083 to 1.52 pCi/g (Figure 5a, section 4.1.3). The highest activity level reported was in a bass sample from the Four Mile Creek location. Historically reported ESOP data for Sr-90 is given (Figures 5b and 5c, section 4.1.3).

Individual Fish Analyses

Larger, older fish may bioaccumulate more contaminants over time. ESOP analyzed and compared data from a single large fish versus the composite it was a part of in order to ascertain the impact a large fish might have on a composite sample. One bass and two catfish were harvested for separate analyses from the Beaver Dam Creek, Steel Creek, and Lower Three Runs locations. Results are in section 4.1.4.

Aliquots of the edible single sample portions were analyzed for tritium. The tritium activity levels from all three individual samples were very similar to the corresponding composite sample.

Cesium-137 results were obtained for all edible and non-edible single sample portions. The Cs-137 levels from the Beaver Dam Creek single bass samples were virtually identical to the composites. The Cs-137 activity levels from the Steel Creek single catfish samples were slightly higher than the corresponding composites. This result is consistent with data from historical ESOP sampling, when Cs-137 activity from individual catfish samples was greater than that of the corresponding composite. However, Cs-137 was not detected in the Lower Three Runs single catfish samples, while both composites yielded detectable levels, although they were very low. These results demonstrate the variability that can be encountered among separate fish.

Aliquots of non-edible portions of the single catfish were analyzed for Sr-90. The Steel Creek samples were both non-detects, and the Lower Three Runs samples were identical.

DOE-SR Program

ESOP data collected for this project in 2003 was compared to DOE-SR reported information. Data comparison summaries are located in section 4.1.4. One difference between the two programs is that ESOP analyzes one composite type from each species for each location, whereas the DOE-SR program analyzes three per location. Therefore, a single composite for an ESOP location was compared to the average of the three DOE-SR composites reported.

ESOP tritium values from largemouth bass were consistently higher than the DOE-SR data, with the exception of the location upstream of the SRS, where non-detects were produced by both programs. The ESOP result from Four Mile Creek was much higher than the DOE-SR value. Tritium values from catfish were generally similar between the two programs. Cs-137 results for bass and catfish from ESOP and DOE-SR were in the same order-of-magnitude or non-detects. ESOP Sr-89/90 values were generally similar to DOE-SR reported values, with the exception of Four Mile Creek again. Discrepancies in these results could be attributed to the natural variation in bioaccumulation amongst individual fish.

CONCLUSIONS / RECOMMENDATIONS

A review of ESOP data indicates that DOE-SR operations have impacted fish. Higher levels of radionuclides are found in Savannah River fish collected adjacent to and downstream of SRS

compared to upstream. Fish from background locations tend not to exhibit detectable levels of man-made radionuclides.

The project attempted to determine if activity levels in larger fish might impact a composite of relatively smaller fish. Individual portions of one bass and two catfish, considerably larger than the other fish sampled, were analyzed separately and compared to their respective composites. Results of tritium and gamma analyses showed no significant difference between the samples. Collections of larger fish will continue in 2004 in order to provide additional data for assessment of this possible impact.

ESOP project data was compared to DOE-SR reported information. Compared tritium and strontium data were not similar for the Four Mile Creek location. Although there are differences between reported values, ESOP data is consistent with previously reported results. Discrepancies in results could be attributed to the natural variation of radionuclide levels in individual fish.

The ESOP 2003 fish collections included spotted sucker, a species listed in the 2003 South Carolina Fish Consumption Advisories. The ESOP monitoring program will collect one additional species each year in addition to the target species. The species collected in 2004 will be striped mullet (*Mugil cephalus*) and/or American shad (*Alosa sapidissima*). This will augment the existing data on Savannah River fish, and provide information for human health assessment.

The Congaree River background location will be discontinued in 2004. The V.C. Summer Nuclear Power Plant near Jenkinsville, South Carolina, discharges water containing tritium into the Broad River. Downstream of that discharge, the Broad River joins the Saluda River to form the Congaree. Detection of tritium in fish collected at the Congaree River station shows that the Summer plant is impacting fish at that location, thereby negating the use of that site as a background station.

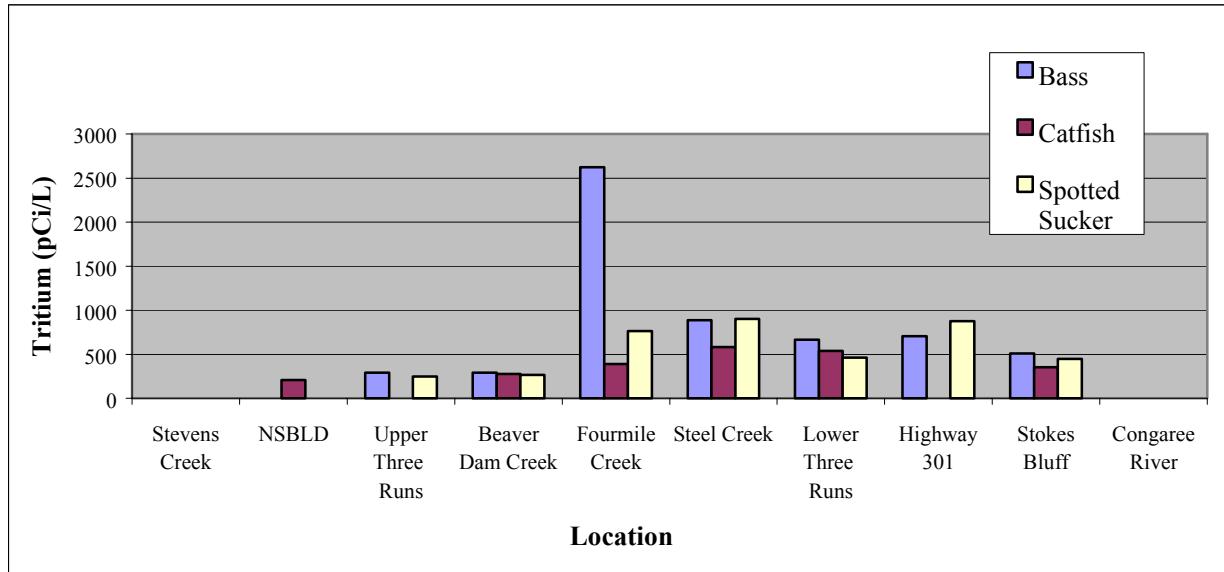
Independent monitoring of radionuclide levels in Savannah River fish will continue along with evaluating the DOE-SR Radiological Fish Monitoring Program. Continued monitoring will provide a better understanding of actual radionuclide levels, their extent, and trends. Several important benefits can be realized as a result. Foremost is the ability for SCDHEC Bureau of Water and the Division of Health Hazard Evaluation to further evaluate the potential human health risk associated with consumption of Savannah River fish. SCDHEC will be able to better advise, inform, and protect those people at risk. Another benefit will be the ability to compare this data with historical data. Data comparison will also be part of the further evaluation of the DOE-SR program, allowing the data reported by DOE-SR to be verified. This independent verification will provide credibility and confidence in the DOE-SR data and its uses.

4.1.2**Map 11. Radiological Monitoring of Fish Associated With SRS**

4.1.3 Tables and Figures

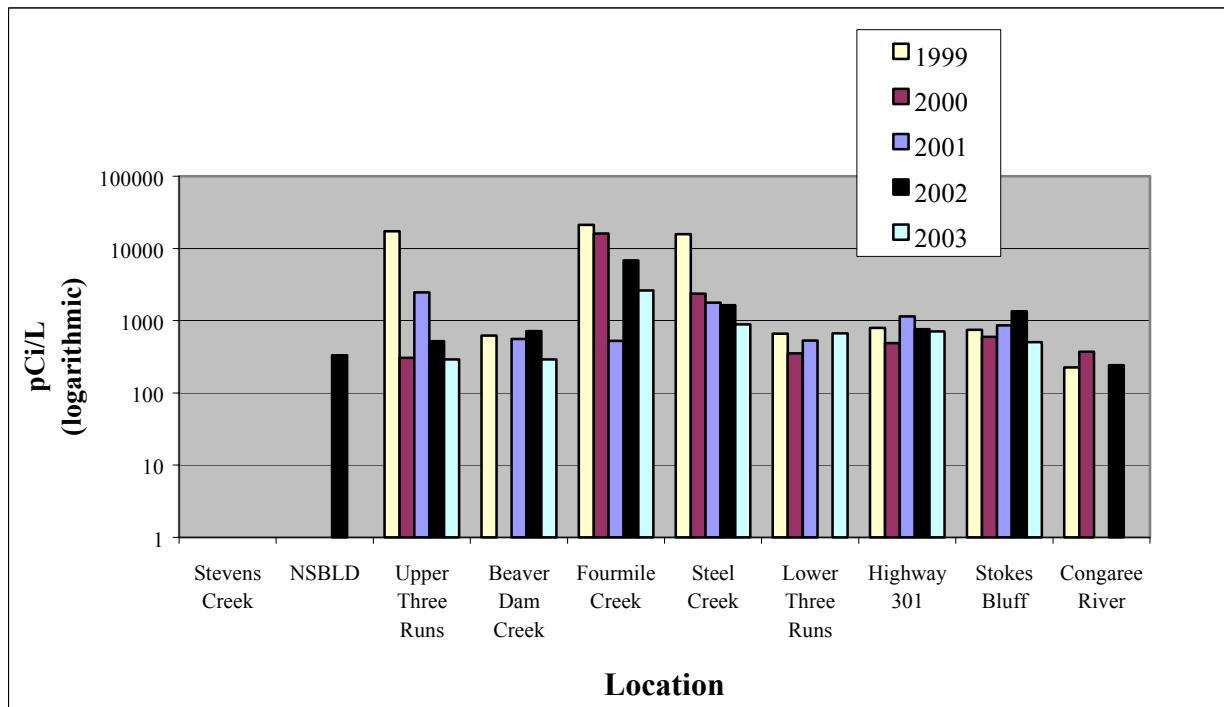
Radiological Fish Monitoring, 2003

Figure 1a. Tritium in Fish Composites



**Spotted sucker not sampled at Stevens Creek, NSBLD, or Congaree River.
Catfish species vary.**

Figure 1b. Tritium in Bass Composites, 1999-2003



Radiological Fish Monitoring, 2003

Figure 1c. Tritium in Catfish Composites, 1999-2003.

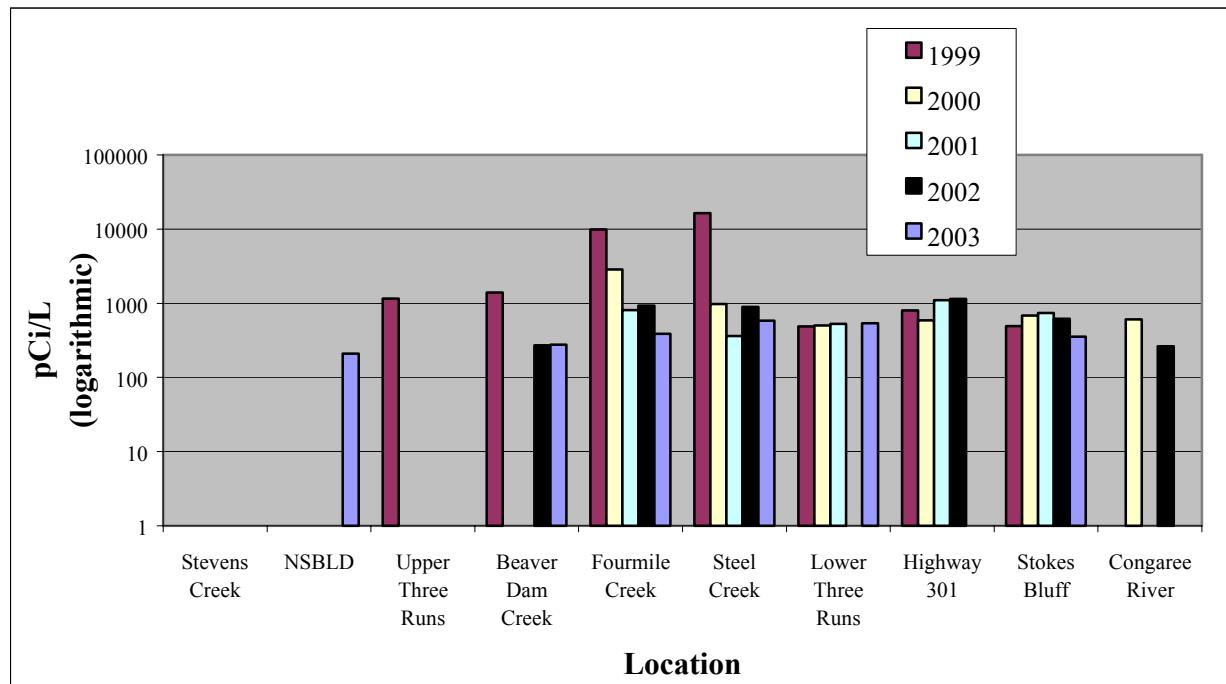
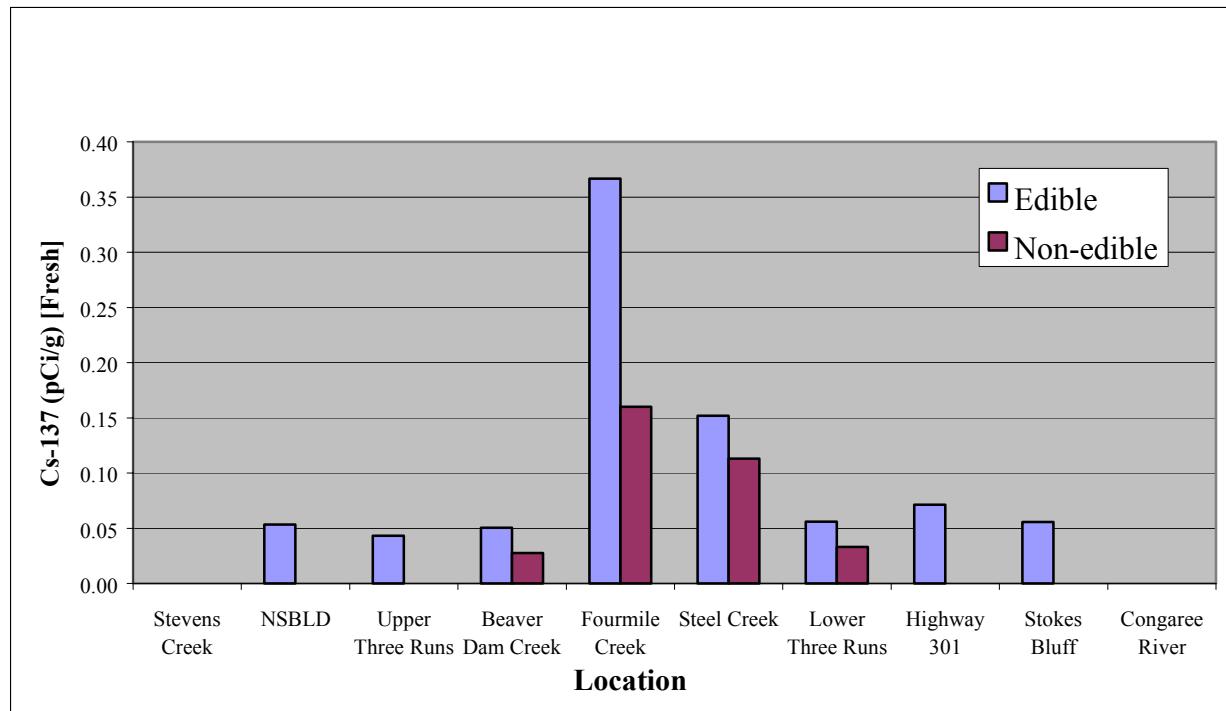


Figure 2a. Cesium-137 in Bass Composites



Radiological Fish Monitoring, 2003

Figure 2b. Cesium-137 in Edible Bass Composites, 1999-2003.

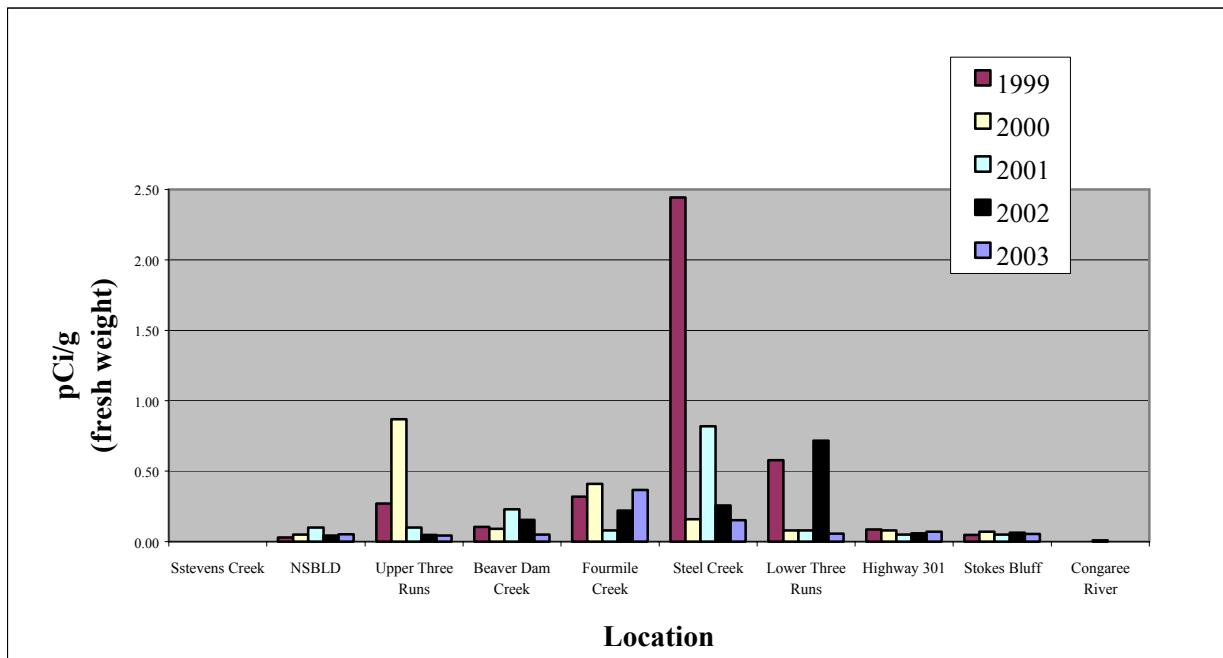
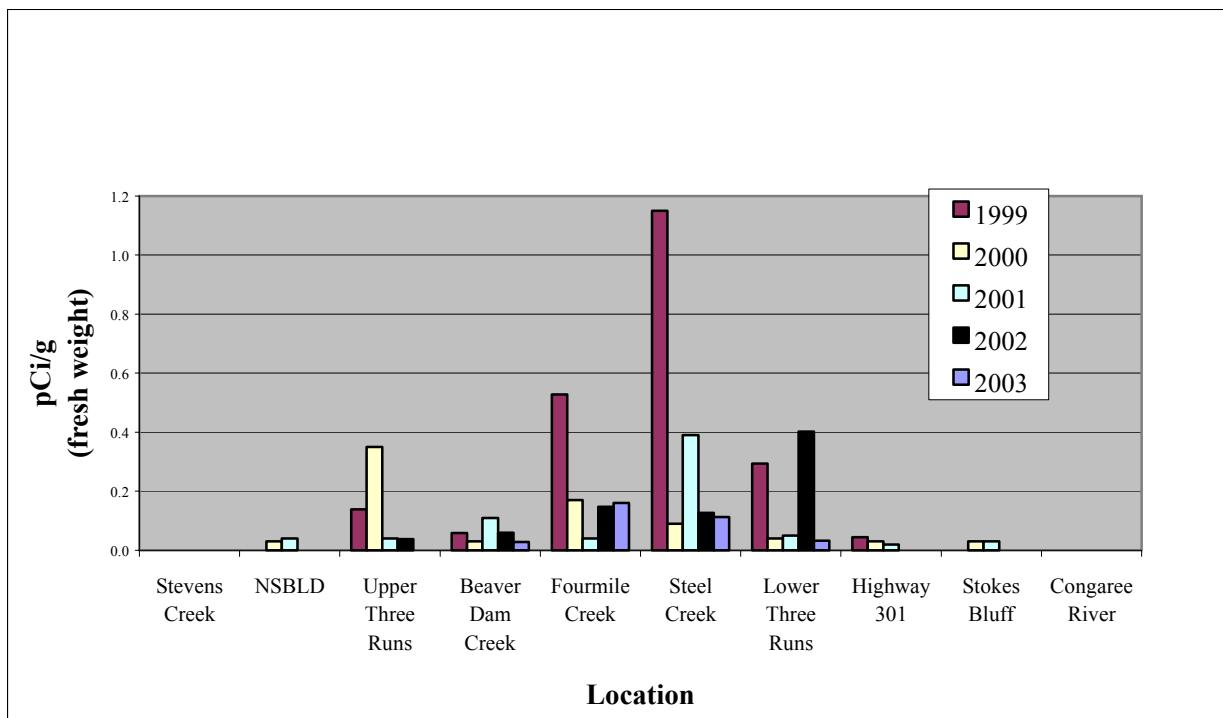


Figure 2c Cesium-137 in Non-edible Bass Composites, 1999-2003.



Radiological Fish Monitoring, 2003

Figure 3a. Cesium-137 in Catfish Composites.

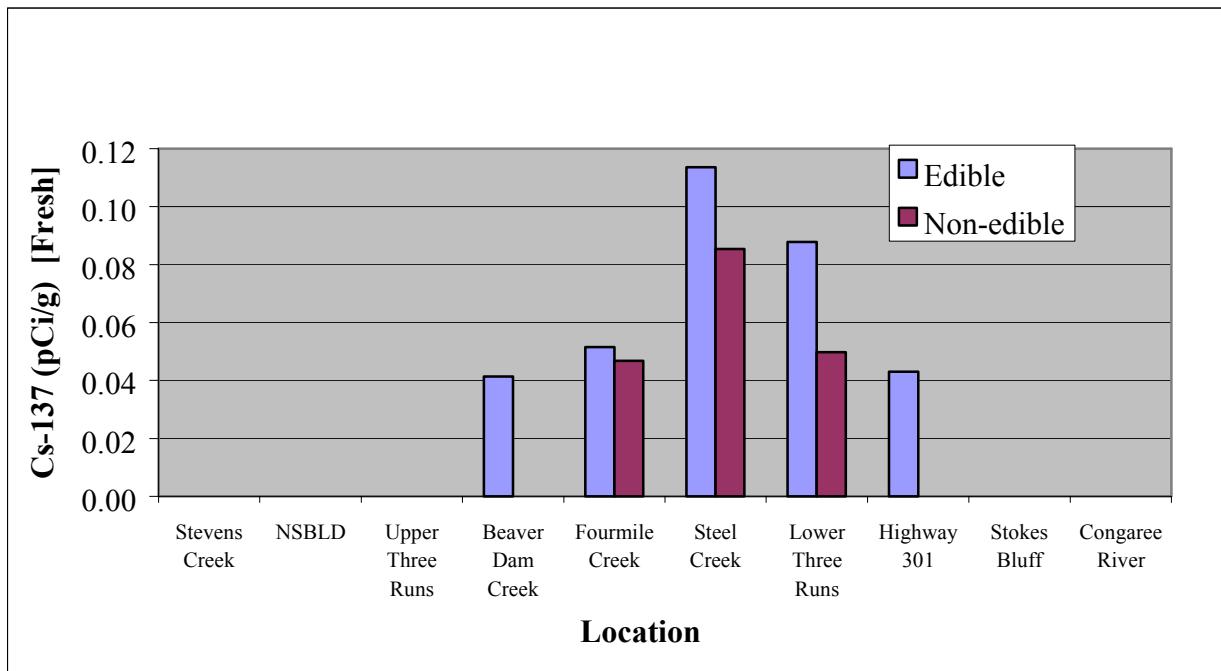
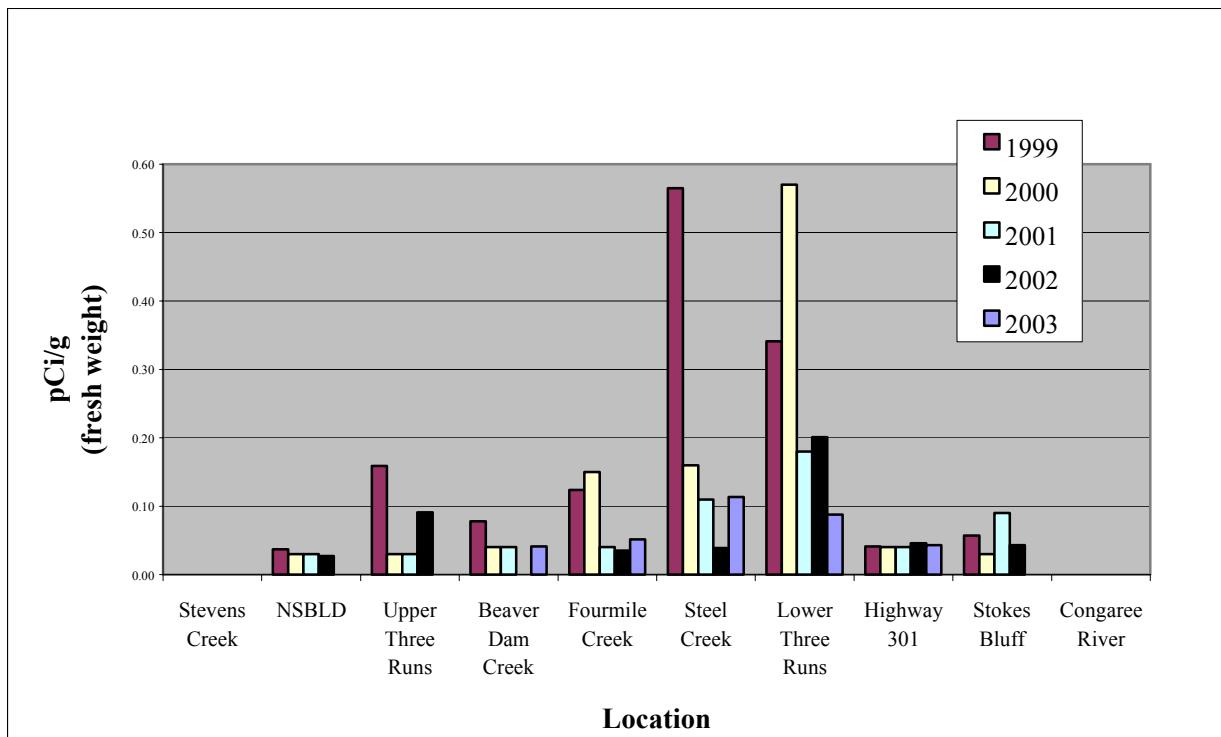


Figure 3b. Cesium-137 in Edible Catfish Composites, 1999-2003.



Radiological Fish Monitoring, 2003

Figure 3c. Cesium –137 in Non-edible Catfish Composites, 1999-2003.

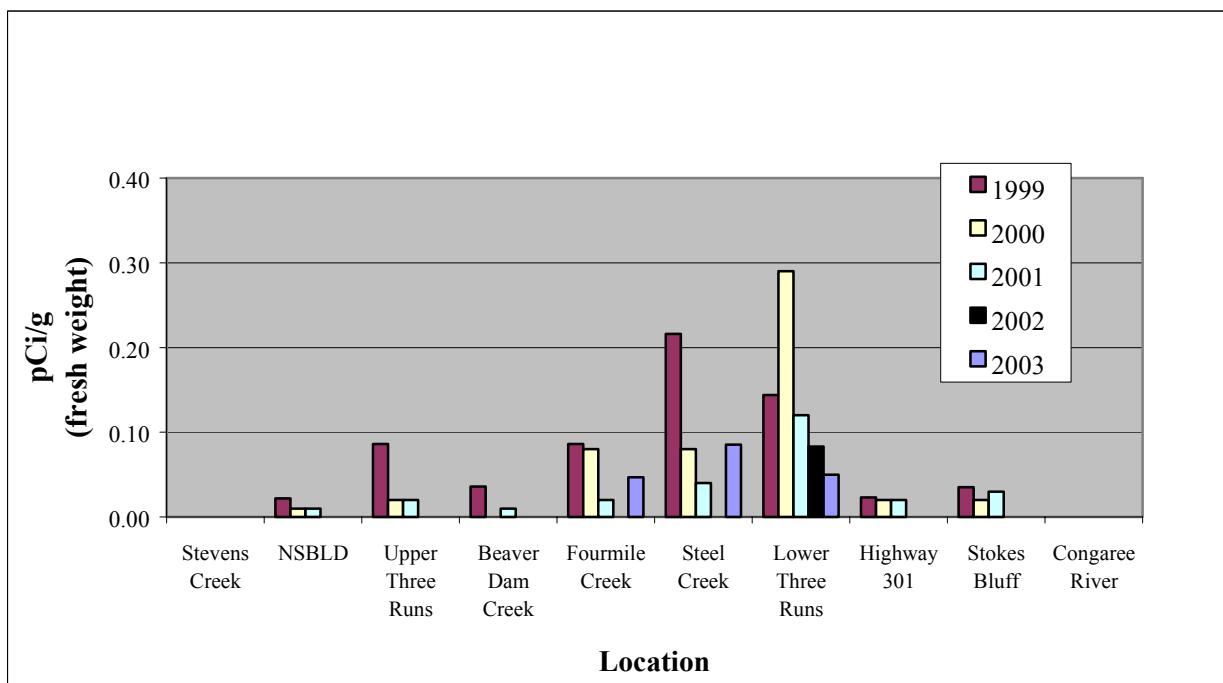
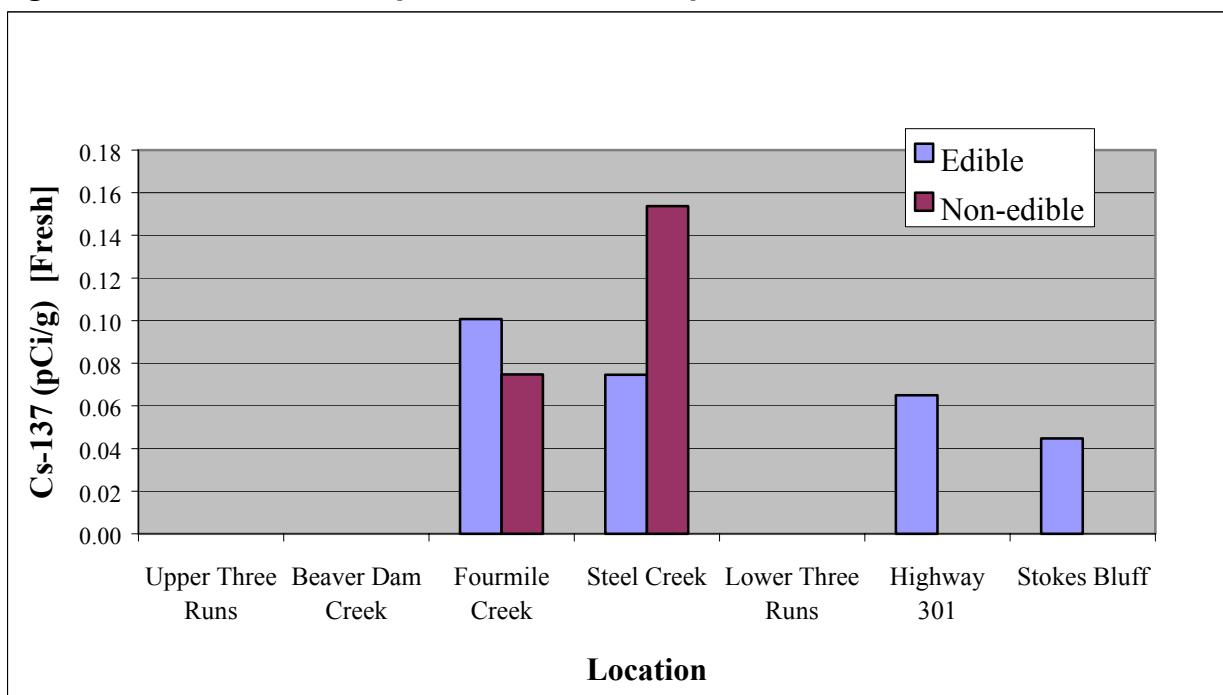


Figure 4. Cesium-137 in Spotted Sucker Composites.



Spotted sucker not sampled at Stevens Creek, NSBLD, and Congaree River

Radiological Fish Monitoring, 2003

Figure 5a. Strontium-90 in Non-edible Fish Composites.

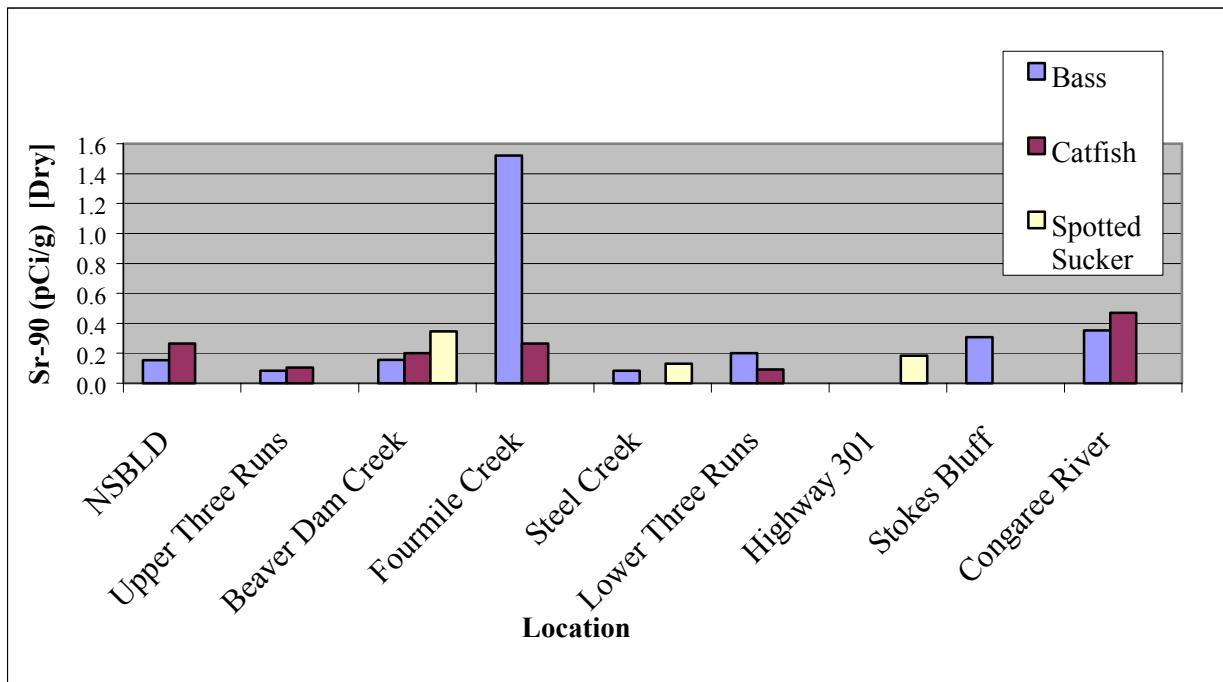
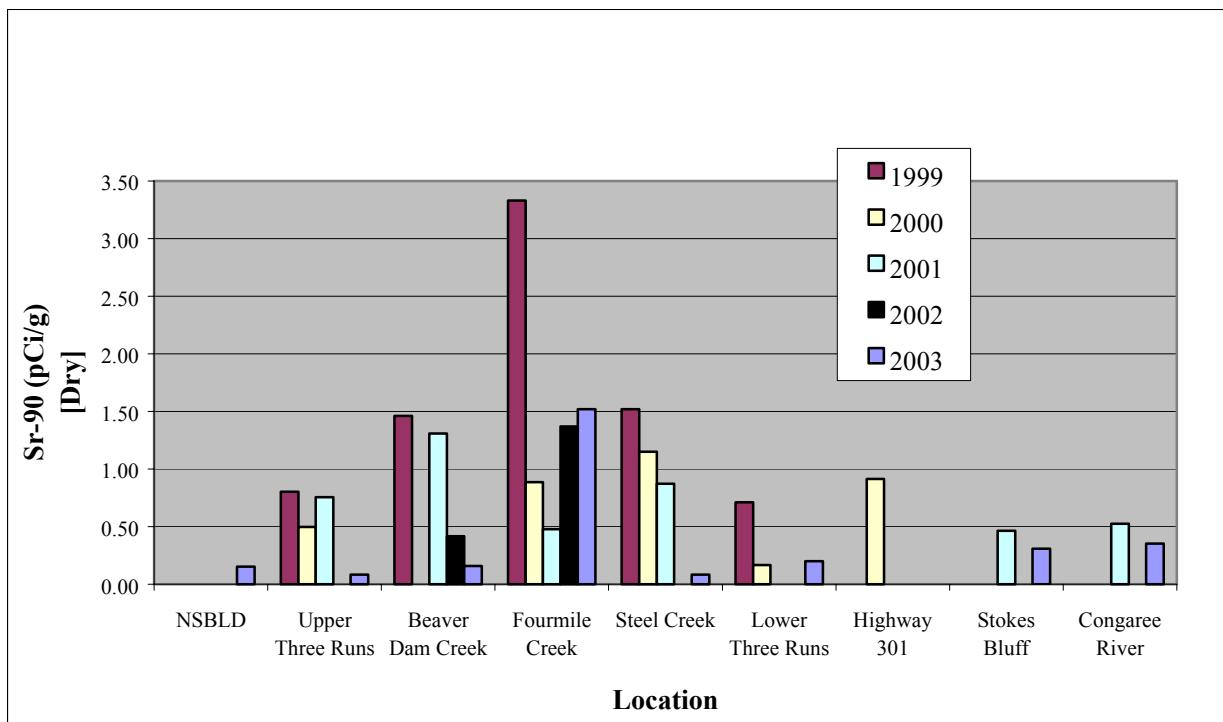
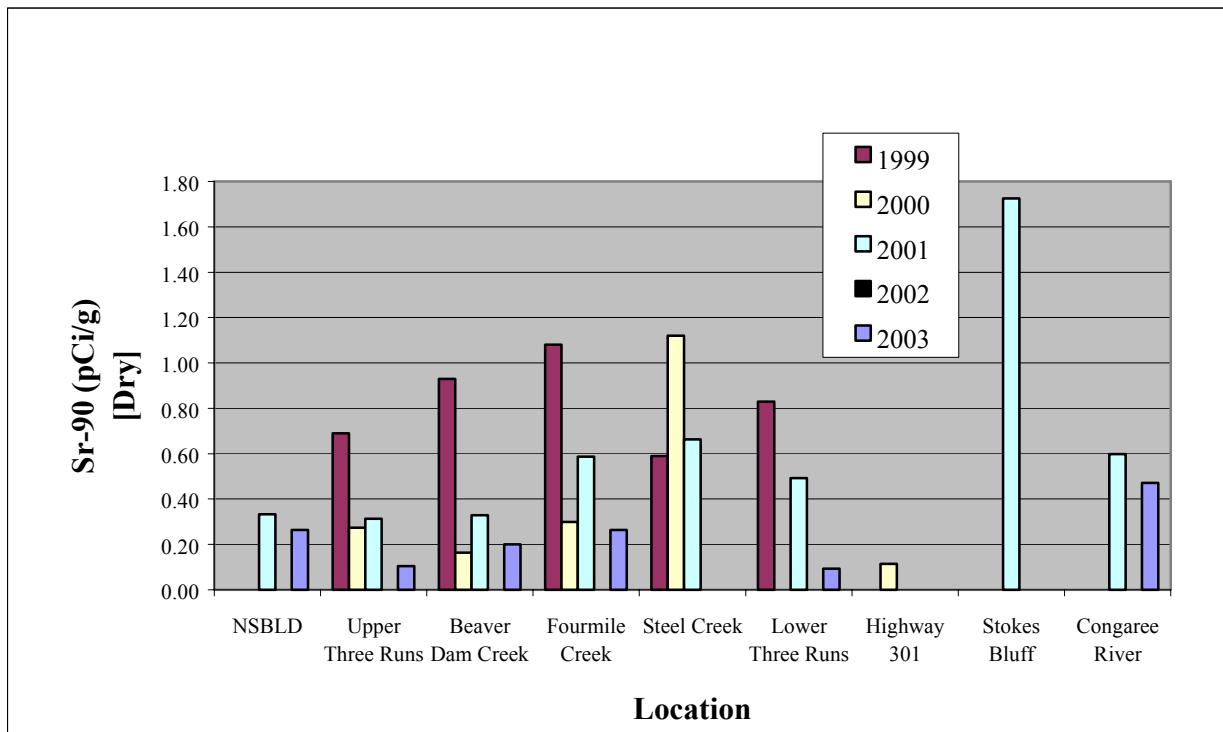


Figure 5b. Strontium-90 in Non-edible Bass Composites, 1999-2003.



Radiological Fish Monitoring, 2003**Figure 5c. Strontium-90 in Non-edible Catfish Composites, 1999-2003.**

4.1.4 Data**Radiological Monitoring of Fish in the Savannah River, 2003**

Radionuclides Data	280
ESOP Historical Data, 1999-2003	290
ESOP and DOE-SR Data Comparison, 2003.....	294

Notes:

1. (<) - less than the LLD (Lower Limit of Detection) provided
2. MDA - minimum detectable activity

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

Sample Location		Stevens Creek	Stevens Creek	Stevens Creek	Stevens Creek
Sample Station		SV-2059	SV-2059	SV-2059	SV-2059
Sample Date		4/15/03	4/15/03	6/27/03	6/27/03
Sample Cut		Edible	Nonedible	Edible	Nonedible
Species		Bass	Bass	Catfish	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	<197	Not Analyzed	<192	Not Analyzed
	Cs-137 (Wet) +/- 2 Sigma MDA	Non-detect 0.013	Non-detect 0.015	Non-detect 0.013	Non-detect 0.010
	Sr-89 (Drv) +/- 2 Sigma MDA	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed
	Sr-90 (Drv) +/- 2 Sigma MDA	Not Analyzed	Not Analyzed	Not Analyzed	Not Analyzed

Sample Location		NSBLD	NSBLD	NSBLD	NSBLD
Sample Station		SV-2028	SV-2028	SV-2028	SV-2028
Sample Date		4/30/03	4/30/03	4/30/03	4/30/03
Sample Cut		Edible	Nonedible	Edible	Nonedible
Species		Bass	Bass	Catfish	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	<197	Not Analyzed	209 106	Not Analyzed
	Cs-137 (Wet) +/- 2 Sigma MDA	0.053 0.016 0.015	Non-detect 0.015	Non-detect 0.012	Non-detect 0.014
	Sr-89 (Drv) +/- 2 Sigma MDA	Not Analyzed	Non-detect 0.087	Not Analyzed	Non-detect 0.511
	Sr-90 (Drv) +/- 2 Sigma MDA	Not Analyzed	0.153 0.06 0.059	Not Analyzed	0.264 0.14 0.194

NSBLD = New Savannah Bluff Lock & Dam

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

Sample Location		Upper Three Runs	Upper Three Runs	Upper Three Runs
Sample Station		SV-2011	SV-2011	SV-2011
Sample Date		4/21/03	4/21/03	4/21/03
Sample Cut		Edible	Nonedible	Edible
Species		Bass	Bass	Catfish
	Tritium (pCi/L) +/- 2 Sigma	292 115	Not Analyzed	<197
Radionuclides (pCi/g)	Cs-137 (Wet) +/- 2 Sigma	0.043 0.014	Non-detect	Non-detect
	MDA	0.014	0.014	0.014
	Sr-89 (Dry) +/- 2 Sigma	Not Analyzed	0.173 0.15 0.096	Not Analyzed
	MDA			
	Sr-90 (Dry) +/- 2 Sigma	Not Analyzed	0.076 0.04 0.065	Not Analyzed
	MDA			

Sample Location		Upper Three Runs	Upper Three Runs	Upper Three Runs
Sample Station		SV-2011	SV-2011	SV-2011
Sample Date		4/21/03	4/21/03	4/21/03
Sample Cut		Nonedible	Edible	Nonedible
Species		Catfish	Spotted sucker	Spotted sucker
	Tritium (pCi/L) +/- 2 Sigma	Not Analyzed	247 113	Not Analyzed
Radionuclides (pCi/g)	Cs-137 (Wet) +/- 2 Sigma	Non-detect	Non-detect	Non-detect
	MDA	0.014	0.015	0.014
	Sr-89 (Dry) +/- 2 Sigma	Non-detect	Not Analyzed	Not Analyzed
	MDA	0.124		
	Sr-90 (Dry) +/- 2 Sigma	0.105 0.06	Not Analyzed	Not Analyzed
	MDA	0.079		

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

Sample Location		Beaver Dam Creek	Beaver Dam Creek	Beaver Dam Creek
Sample Station		SV-2013	SV-2013	SV-2013
Sample Date		6/9/03	6/9/03	5/21/03
Sample Cut		Edible	Nonedible	Edible
Species		Bass	Bass	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	292 93	Not Analyzed	277 110
	Cs-137 (Wet) +/- 2 Sigma	0.051 0.019	0.028 0.013	0.041 0.014
	MDA	0.018	0.011	0.012
	Sr-89 (Drv) +/- 2 Sigma	Not Analyzed	Non-detect	Not Analyzed
	MDA		0.392	
	Sr-90 (Drv) +/- 2 Sigma	Not Analyzed	0.157 0.08	Not Analyzed
	MDA		0.136	

Sample Location		Beaver Dam Creek	Beaver Dam Creek	Beaver Dam Creek
Sample Station		SV-2013	SV-2013	SV-2013
Sample Date		5/21/03	6/9/03	6/9/03
Sample Cut		Nonedible	Edible	Nonedible
Species		Catfish	Spotted sucker	Spotted sucker
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	Not Analyzed	264 109	Not Analyzed
	Cs-137 (Wet) +/- 2 Sigma	Non-detect	Non-detect	Non-detect
	MDA	0.016	0.015	0.014
	Sr-89 (Drv) +/- 2 Sigma	Non-detect	Not Analyzed	Non-detect
	MDA	0.369		0.274
	Sr-90 (Drv) +/- 2 Sigma	0.201 0.12	Not Analyzed	0.345 0.15
	MDA	0.153		0.155

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

<u>Sample Location</u>		Fourmile Creek	Fourmile Creek	Fourmile Creek
<u>Sample Station</u>		SV-2015	SV-2015	SV-2015
<u>Sample Date</u>		5/21/03	5/21/03	5/21/03
<u>Sample Cut</u>		Edible	Nonedible	Edible
<u>Species</u>		Bass	Bass	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L)	2621	Not Analyzed	388
	+/- 2 Sigma	160		116
	Cs-137 (Wet)	0.367	0.160	0.052
	+/- 2 Sigma	0.045	0.025	0.010
	MDA	0.013	0.010	0.009
	Sr-89 (Dry)	Not Analyzed	Non-detect	Not Analyzed
	+/- 2 Sigma		0.465	
	MDA			
	Sr-90 (Dry)	Not Analyzed	1.52	Not Analyzed
	+/- 2 Sigma		0.31	
	MDA		0.127	

<u>Sample Location</u>		Fourmile Creek	Fourmile Creek	Fourmile Creek
<u>Sample Station</u>		SV-2015	SV-2015	SV-2015
<u>Sample Date</u>		5/21/03	5/21/03	5/21/03
<u>Sample Cut</u>		Nonedible	Edible	Nonedible
<u>Species</u>		Catfish	Spotted sucker	Spotted sucker
Radionuclides (pCi/g)	Tritium (pCi/L)	Not Analyzed	764	Not Analyzed
	+/- 2 Sigma		134	
	Cs-137 (Wet)	0.047	0.101	0.075
	+/- 2 Sigma	0.014	0.019	0.015
	MDA	0.013	0.011	0.014
	Sr-89 (Dry)	Non-detect	Not Analyzed	Non-detect
	+/- 2 Sigma			0.405
	MDA	0.389		
	Sr-90 (Dry)	0.264	Not Analyzed	Non-detect
	+/- 2 Sigma	0.14		
	MDA	0.163		0.226

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

Sample Location		Steel Creek	Steel Creek	Steel Creek
Sample Station		SV-2017	SV-2017	SV-2017
Sample Date		4/24/03	4/24/03	4/24/03
Sample Cut		Edible	Nonedible	Edible
Species		Bass	Bass	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L)	888	Not Analyzed	583
	+/- 2 Sigma	142		129
	Cs-137 (Wet)	0.152	0.113	0.114
	+/- 2 Sigma	0.029	0.024	0.022
	MDA	0.022	0.019	0.019
	Sr-89 (Dry)	Not Analyzed	Non-detect	Not Analyzed
	+/- 2 Sigma		0.098	
	MDA			
	Sr-90 (Dry)	Not Analyzed	0.083	Not Analyzed
	+/- 2 Sigma		0.04	
	MDA		0.052	

Sample Location		Steel Creek	Steel Creek	Steel Creek
Sample Station		SV-2017	SV-2017	SV-2017
Sample Date		4/24/03	4/24/03	4/24/03
Sample Cut		Nonedible	Edible	Nonedible
Species		Catfish	Spotted sucker	Spotted sucker
Radionuclides (pCi/g)	Tritium (pCi/L)	Not Analyzed	902	Not Analyzed
	+/- 2 Sigma		143	
	Cs-137 (Wet)	0.085	0.075	0.154
	+/- 2 Sigma	0.023	0.022	0.030
	MDA	0.017	0.020	0.018
	Sr-89 (Dry)	Non-detect	Not Analyzed	Non-detect
	+/- 2 Sigma			
	MDA	0.130		0.098
	Sr-90 (Dry)	Non-detect	Not Analyzed	0.131
	+/- 2 Sigma			0.05
	MDA	0.083		0.060

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

Sample Location		Lower Three Runs	Lower Three Runs	Lower Three Runs
Sample Station		SV-2020	SV-2020	SV-2020
Sample Date		8/13/03	8/13/03	4/28/03
Sample Cut		Edible	Nonedible	Edible
Species		Bass	Bass	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L)	666	Not Analyzed	537
	+/- 2 Sigma	107		127
	Cs-137 (Wet)	0.056	0.033	0.088
	+/- 2 Sigma	0.017	0.011	0.018
	MDA	0.015	0.013	0.016
	Sr-89 (Drv)	Not Analyzed	Non-detect	Not Analyzed
	+/- 2 Sigma		0.144	
	MDA			
	Sr-90 (Drv)	Not Analyzed	0.200	Not Analyzed
	+/- 2 Sigma		0.08	
	MDA		0.119	

Sample Location		Lower Three Runs	Lower Three Runs	Lower Three Runs
Sample Station		SV-2020	SV-2020	SV-2020
Sample Date		4/28/03	8/13/03	8/13/03
Sample Cut		Nonedible	Edible	Nonedible
Species		Catfish	Spotted sucker	Spotted sucker
Radionuclides (pCi/g)	Tritium (pCi/L)	Not Analyzed	461	Not Analyzed
	+/- 2 Sigma		100	
	Cs-137 (Wet)	0.050	Non-detect	Non-detect
	+/- 2 Sigma	0.018		
	MDA	0.016	0.011	0.014
	Sr-89 (Drv)	Non-detect	Not Analyzed	Not Analyzed
	+/- 2 Sigma			
	MDA	0.090		
	Sr-90 (Drv)	Not Analyzed	Not Analyzed	Not Analyzed
	+/- 2 Sigma	0.04		
	MDA	0.053		

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

<u>Sample Location</u>		Hwy. 301	Hwy. 301	Hwy. 301
<u>Sample Station</u>		SV-118	SV-118	SV-118
<u>Sample Date</u>		5/7/03	5/7/03	5/1/03
<u>Sample Cut</u>		Edible	Nonedible	Edible
<u>Species</u>		Bass	Bass	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L)	705	Not Analyzed	<190
	+/- 2 Sigma	131		
	Cs-137 (Wet)	0.071	Non-detect	0.043
	+/- 2 Sigma	0.018		0.031
	MDA	0.016	0.016	0.016
Sr-89 (Dry)			Non-detect	Not Analyzed
	+/- 2 Sigma		0.451	
	MDA			
Sr-90 (Dry)		Not Analyzed	Non-detect	Not Analyzed
	+/- 2 Sigma			
	MDA		0.155	

<u>Sample Location</u>		Hwy. 301	Hwy. 301	Hwy. 301
<u>Sample Station</u>		SV-118	SV-118	SV-118
<u>Sample Date</u>		5/1/03	5/7/03	5/7/03
<u>Sample Cut</u>		Nonedible	Edible	Nonedible
<u>Species</u>		Catfish	Spotted sucker	Spotted sucker
Radionuclides (pCi/g)	Tritium (pCi/L)	Not Analyzed	875	Not Analyzed
	+/- 2 Sigma		138	
	Cs-137 (Wet)	Non-detect	0.065	Non-detect
	+/- 2 Sigma		0.025	
	MDA	0.018	0.018	0.017
Sr-89 (Dry)		Non-detect	Not Analyzed	Non-detect
	+/- 2 Sigma			
	MDA	0.620		0.511
Sr-90 (Dry)		Non-detect	Not Analyzed	0.184
	+/- 2 Sigma			0.12
	MDA	0.211		0.175

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

<u>Sample Location</u>		Stokes Bluff	Stokes Bluff	Stokes Bluff
<u>Sample Station</u>		SV-355	SV-355	SV-355
<u>Sample Date</u>		7/2/03	7/2/03	7/02/003
<u>Sample Cut</u>		Edible	Nonedible	Edible
<u>Species</u>		Bass	Bass	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L)	508	Not Analyzed	354
	+/- 2 Sigma	122		114
	Cs-137 (Wet)	0.056	Non-detect	Non-detect
	+/- 2 Sigma	0.016		
	MDA	0.014	0.014	0.015
	Sr-89 (Dry)	Not Analyzed	Non-detect	Not Analyzed
	+/- 2 Sigma		0.197	
	MDA			
	Sr-90 (Dry)	Not Analyzed	0.308	Not Analyzed
	+/- 2 Sigma		0.14	
	MDA		0.153	

<u>Sample Location</u>		Stokes Bluff	Stokes Bluff	Stokes Bluff
<u>Sample Station</u>		SV-355	SV-355	SV-355
<u>Sample Date</u>		7/02/003	7/02/003	7/02/003
<u>Sample Cut</u>		Nonedible	Edible	Nonedible
<u>Species</u>		Catfish	Spotted sucker	Spotted sucker
Radionuclides (pCi/g)	Tritium (pCi/L)	Not Analyzed	449	Not Analyzed
	+/- 2 Sigma		119	
	Cs-137 (Wet)	Non-detect	0.045	Non-detect
	+/- 2 Sigma		0.015	
	MDA	0.015	0.014	0.014
	Sr-89 (Dry)	Non-detect	Not Analyzed	Non-detect
	+/- 2 Sigma			
	MDA	0.211		0.377
	Sr-90 (Dry)	Non-detect	Not Analyzed	Non-detect
	+/- 2 Sigma			
	MDA	0.209		0.434

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

<u>Sample Location</u>		Congaree River	Congaree River	Congaree River
<u>Sample Station</u>		C-007	C-007	C-007
<u>Sample Date</u>		6/26/03	6/26/03	6/6/03
<u>Sample Cut</u>		Edible	Nonedible	Edible
<u>Species</u>		Bass	Bass	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	<190	Not Analyzed	<190
	Cs-137 (Wet) +/- 2 Sigma	Non-detect	Non-detect	Non-detect
	MDA	0.015	0.013	0.016
	Sr-89 (Dry) +/- 2 Sigma	Not Analyzed	Non-detect	Not Analyzed
	MDA		0.220	
	Sr-90 (Dry) +/- 2 Sigma	Not Analyzed	0.353	Not Analyzed
	MDA		0.15	
			0.144	

<u>Sample Location</u>		BDC-Individual	BDC-Individual
<u>Sample Station</u>		SV-2013	SV-2013
<u>Sample Date</u>		8/11/03	8/11/03
<u>Sample Cut</u>		Edible	Nonedible
<u>Species</u>		Bass	Bass
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	337	Not Analyzed
		95	
	Cs-137 (Wet) +/- 2 Sigma	0.046	0.035
	MDA	0.017	0.015
		0.013	0.012
	Sr-89 (Dry) +/- 2 Sigma	Not Analyzed	Not Analyzed
	MDA		
	Sr-90 (Dry) +/- 2 Sigma	Not Analyzed	Not Analyzed
	MDA		

BDC = Beaver Dam Creek

Radiological Monitoring of Fish Data, 2003

Radionuclides Data

Sample Location		STC -Individual	STC -Individual
Sample Station		SV-2017	SV-2017
Sample Date		4/24/2003	4/24/2003
Sample Cut		Edible	Nonedible
Species		Catfish	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	537 127	Not Analyzed
	Cs-137 (Wet) +/- 2 Sigma	0.158 0.027	0.129 0.026
	MDA	0.020	0.019
	Sr-89 (Dry) +/- 2 Sigma	Not Analyzed	Non-detect
	MDA		0.099
	Sr-90 (Dry) +/- 2 Sigma	Not Analyzed	Non-detect
	MDA		0.060

STC = Steel Creek

Sample Location		LTR -Individual	LTR -Individual
Sample Station		SV-2020	SV-2020
Sample Date		4/28/2003	4/28/2003
Sample Cut		Edible	Nonedible
Species		Catfish	Catfish
Radionuclides (pCi/g)	Tritium (pCi/L) +/- 2 Sigma	535 127	Not Analyzed
	Cs-137 (Wet) +/- 2 Sigma	Non-detect	Non-detect
	MDA	0.016	0.018
	Sr-89 (Dry) +/- 2 Sigma	Not Analyzed	0.207 0.16
	MDA		0.095
	Sr-90 (Dry) +/- 2 Sigma	Not Analyzed	0.093 0.05
	MDA		0.066

LTR = Lower Three Runs

Radiological Monitoring of Fish Data, 2003
ESOP Historical Data, 1998-2003

Year	Sample Location		Stevens	NSBLD	UTR	BDC	FMC	
	Sample Station		SV-2059	SV-2028	SV-2011	SV-2013	SV-2015	
	Sample Cut		Edible	Edible	Edible	Edible	Edible	
	Species		Bass	Bass	Bass	Bass	Bass	
2003	Radionuclide	Tritium (pCi/L)	ND	ND	292	292	2621	
2002			ND	332	524	718	6,801	
2001			ND	ND	2,462	562	525	
2000			ND	ND	306	ND	16,031	
1999			ND	ND	17,263	621	21,298	
2003	Radionuclide	Cs-137 (pCi/g wet)	ND	0.05	0.04	0.05	0.37	
2002			ND	0.04	0.05	0.16	0.22	
2001			ND	0.10	0.10	0.23	0.08	
2000			ND	0.05	0.87	0.09	0.41	
1999			ND	0.03	0.27	0.10	0.32	
Year	Sample Location		STC	LTR	Hwy. 301	Stokes	Congaree	
	Sample Station		SV-2017	SV-2020	SV-118	SV-355	C-007	
	Sample Cut		Edible	Edible	Edible	Edible	Edible	
	Species		Bass	Bass	Bass	Bass	Bass	
2003	Radionuclide	Tritium (pCi/L)	888	666	705	508	ND	
2002			1,637	ND	763	1,348	243	
2001			1,768	530	1,148	858	ND	
2000			2,353	355	490	597	371	
1999			15,759	662	793	742	225	
2003	Radionuclide	Cs-137 (pCi/g wet)	0.15	0.06	0.07	0.06	ND	
2002			0.26	0.72	0.06	0.06	ND	
2001			0.82	0.08	0.05	0.05	0.01	
2000			0.16	0.08	0.08	0.07	ND	
1999			2.44	0.58	0.09	0.05	ND	

Notes: - Non-Detect **Bold** denotes failed laboratory QA
- Not Analyzed

Radiological Monitoring of Fish Data, 2003
ESOP Historical Data, 1998-2003

Year	Sample Location		Stevens	NSBLD	UTR	BDC	FMC
	Sample Station		SV-2059	SV-2028	SV-2011	SV-2013	SV-2015
	Sample Cut		Non-Edible	Non-Edible	Non-Edible	Non-Edible	Non-Edible
	Species	Bass	Bass	Bass	Bass	Bass	Bass
2003	Radionuclide Cs-137 (pCi/g wet)	ND	ND	ND	0.03	0.16	
2002		ND	ND	0.04	0.06	0.15	
2001		ND	0.04	0.04	0.11	0.04	
2000		ND	0.03	0.35	0.03	0.17	
1999		ND	ND	0.14	0.06	0.53	
2003	Radionuclide Sr-90 (pCi/g DRY)	NA	0.15	0.08	0.16	1.52	
2002		NA	NA	ND	0.42	1.37	
2001		NA	NA	0.76	1.31	0.48	
2000		NA	NA	0.50	NA	0.89	
1999		NA	NA	0.80	1.46	3.33	
Year	Sample Location		STC	LTR	Hwy. 301	Stokes	Congaree
	Sample Station		SV-2017	SV-2020	SV-118	SV-355	C-007
	Sample Cut		Non-Edible	Non-Edible	Non-Edible	Non-Edible	Non-Edible
	Species	Bass	Bass	Bass	Bass	Bass	Bass
2003	Radionuclide Cs-137 (pCi/g wet)	0.11	0.03	ND	ND	ND	
2002		0.13	0.40	ND	ND	ND	
2001		0.39	0.05	0.02	0.03	ND	
2000		0.09	0.04	0.03	0.03	ND	
1999		1.15	0.29	0.04	ND	ND	
2003	Radionuclide Sr-90 (pCi/g DRY)	0.08	0.20	ND	0.31	0.35	
2002		NA	ND	ND	NA	NA	
2001		0.87	ND	ND	0.46	0.53	
2000		1.15	0.17	0.91	NA	NA	
1999		1.52	0.71	NA	NA	NA	

Notes: - Non-Detect **Bold** denotes failed laboratory QA
 - Not Analyzed

Radiological Monitoring of Fish Data, 2003

ESOP Historical Data, 1998-2003

Year	<u>Sample Location</u>		Stevens	NSBLD	UTR	BDC	FMC
	<u>Sample Station</u>		SV-2059	SV-2028	SV-2011	SV-2013	SV-2015
	<u>Sample Cut</u>		Edible	Edible	Edible	Edible	Edible
	<u>Species</u>		Catfish	Catfish	Catfish	Catfish	Catfish
2003	Radionuclide	Tritium (pCi/L)	ND	209	ND	277	388
2002			ND	ND	ND	271	931
2001			ND	ND	ND	ND	810
2000			ND	ND	ND	ND	2858
1999			ND	ND	1151	1391	9850

2003	Radionuclide	Cs-137 (pCi/g wet)	ND	ND	ND	0.04	0.05
2002			ND	0.03	0.09	ND	0.04
2001			ND	0.03	0.03	0.04	0.04
2000			ND	0.03	0.03	0.04	0.15
1999			ND	0.04	0.16	0.08	0.12

Year	<u>Sample Location</u>		STC	LTR	Hwy. 301	Stokes	Congaree
	<u>Sample Station</u>		SV-2017	SV-2020	SV-118	SV-355	C-007
	<u>Sample Cut</u>		Edible	Edible	Edible	Edible	Edible
	<u>Species</u>		Catfish	Catfish	Catfish	Catfish	Catfish
2003	Radionuclide	Tritium (pCi/L)	583	537	ND	354	ND
2002			890	ND	1150	621	263
2001			360	530	1104	736	ND
2000			975	500	590	685	607
1999			16367	487	802	492	ND

2003	Radionuclide	Cs-137 (pCi/g wet)	0.11	0.09	0.04	ND	ND
2002			0.04	0.20	0.05	0.04	ND
2001			0.11	0.18	0.04	0.09	ND
2000			0.16	0.57	0.04	0.03	ND
1999			0.57	0.34	0.04	0.06	ND

Notes: - Non-Detect **Bold** denotes failed laboratory QA
 - Not Analyzed

Radiological Monitoring of Fish Data, 2003

ESOP Historical Data, 1998-2003

Year	Sample Location		Stevens	NSBLD	UTR	BDC	FMC
	Sample Station		SV-2059	SV-2028	SV-2011	SV-2013	SV-2015
	Sample Cut		Non-Edible	Non-Edible	Non-Edible	Non-Edible	Non-Edible
	Species		Catfish	Catfish	Catfish	Catfish	Catfish
2003	Radionuclide Cs-137 (pCi/g wet)	ND	ND	ND	ND	0.05	
2002		ND	ND	ND	ND	ND	
2001		ND	0.01	0.02	0.01	0.02	
2000		ND	0.01	0.02		0.08	
1999		ND	0.02	0.09	0.04	0.09	
2003	Radionuclide Sr-90 (pCi/g DRY)	NA	0.26	0.11	0.20	0.26	
2002		NA	NA	ND	ND	ND	
2001		NA	0.33	0.31	0.33	0.59	
2000		NA	NA	0.274	0.16	0.30	
1999		NA	NA	0.69	0.93	1.08	
Year	Sample Location		STC	LTR	Hwy. 301	Stokes	Congaree
	Sample Station		SV-2017	SV-2020	SV-118	SV-355	C-007
	Sample Cut		Non-Edible	Non-Edible	Non-Edible	Non-Edible	Non-Edible
	Species		Catfish	Catfish	Catfish	Catfish	Catfish
2003	Radionuclide Cs-137 (pCi/g wet)	0.09	0.05	ND	ND	ND	
2002		ND	0.08	ND	ND	ND	
2001		0.04	0.12	0.02	0.03	ND	
2000		0.08	0.29	0.02	0.02	ND	
1999		0.22	0.14	0.02	0.04	ND	
2003	Radionuclide Sr-90 (pCi/g DRY)	ND	0.09	ND	ND	0.47	
2002		ND	ND	ND	NA	NA	
2001		0.66	0.49	ND	1.73	0.60	
2000		1.12	ND	0.11	NA	NA	
1999		0.59	0.83	NA	NA	NA	

Notes: - Non-Detect **Bold** denotes failed laboratory QA
- Not Analyzed

Radiological Monitoring of Fish Data, 2003 ESOP and DOE-SR Data Comparison, 2003

Table 1 Tritium Activity Levels in Edible Bass pCi/g			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	<LLD
	SRS	3	<MDC
UTR	SCDHEC	1	0.23
	SRS	3	<MDC
BDC	SCDHEC	1	0.23
	SRS	3	0.09
FMC	SCDHEC	1	2.10
	SRS	3	0.06**
STC	SCDHEC	1	0.71
	SRS	3	0.07*
LTR	SCDHEC	1	0.53
	SRS	3	<MDC
Hwy. 301	SCDHEC	1	0.56
	SRS	3	0.11

Table 2 Tritium Activity Levels in Edible Catfish pCi/g			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	0.17
	SRS	3	<MDC
UTR	SCDHEC	1	<LLD
	SRS	3	0.08
BDC	SCDHEC	1	0.22
	SRS	3	0.04**
FMC	SCDHEC	1	0.31
	SRS	3	<MDC
STC	SCDHEC	1	0.47
	SRS	3	0.10*
LTR	SCDHEC	1	0.43
	SRS	3	<MDC
Hwy. 301	SCDHEC	1	<LLD
	SRS	3	0.07*

Notes:

- NSBLD = New Savannah Bluff Lock and Dam
- UTR = Upper Three Runs
- BDC = Beaver Dam Creek
- FMC = Four Mile Creek
- STC = Steel Creek
- LTR = Lower Three Runs
- Hwy. 301 = Savannah River at U.S. Hwy. 301

- LLD = Lower Limit of Detection
- MDC = Minimum Detectable Concentration
- SRS data from WSRC 2004
- SRS results are means
- * includes one result below MDC
- ** includes two results below MDC

Radiological Monitoring of Fish Data, 2003 ESOP and DOE-SR Data Comparison, 2003

Table 3 Cesium-137 Activity Levels in Edible Bass pCi/g			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	0.05
	SRS	3	0.04**
UTR	SCDHEC	1	0.04
	SRS	3	0.02**
BDC	SCDHEC	1	0.05
	SRS	3	0.11
FMC	SCDHEC	1	0.37
	SRS	3	0.58
STC	SCDHEC	1	0.15
	SRS	3	0.05**
LTR	SCDHEC	1	0.06
	SRS	3	0.07*
Hwy. 301	SCDHEC	1	0.07
	SRS	3	0.05
STOKES	SCDHEC	1	0.06
	SRS	3	<MDC

Table 4 Cesium-137 Activity Levels in Edible Catfish pCi/g			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	< MDA
	SRS	3	0.03**
UTR	SCDHEC	1	< MDA
	SRS	3	< MDC
BDC	SCDHEC	1	0.04
	SRS	3	< MDC
FMC	SCDHEC	1	0.05
	SRS	3	0.04**
STC	SCDHEC	1	0.11
	SRS	3	0.11
LTR	SCDHEC	1	0.09
	SRS	3	0.05*
Hwy. 301	SCDHEC	1	0.04
	SRS	3	0.03
STOKES	SCDHEC	1	< MDA
	SRS	3	< MDC

Notes:

- NSBLD = New Savannah Bluff Lock and Dam
- UTR = Upper Three Runs
- BDC = Beaver Dam Creek
- FMC = Four Mile Creek
- STC = Steel Creek
- LTR = Lower Three Runs
- Hwy. 301 = Savannah River at U.S. Hwy. 301
- STOKES = Stokes Bluff

MDA = Minimum Detectable Activity
 MDC = Minimum Detectable Concentration
 SRS data from WSRC 2004
 SRS results are means
 * includes one result below MDC
 ** includes two results below MDC

Radiological Monitoring of Fish Data, 2003 ESOP and DOE-SR Data Comparison, 2003

Table 5 Cesium-137 Activity Levels in Non-edible Bass pCi/g			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	< MDA
	SRS	3	0.03**
UTR	SCDHEC	1	< MDA
	SRS	3	< MDC
BDC	SCDHEC	1	0.03
	SRS	3	0.08
FMC	SCDHEC	1	0.16
	SRS	3	0.14
STC	SCDHEC	1	0.11
	SRS	3	0.04**
LTR	SCDHEC	1	0.03
	SRS	3	0.02**
Hwy. 301	SCDHEC	1	< MDA
	SRS	3	0.03*

Table 6 Cesium-137 Activity Levels in Non-edible Catfish pCi/g			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	< MDA
	SRS	3	< MDC
UTR	SCDHEC	1	< MDA
	SRS	3	< MDC
BDC	SCDHEC	1	< MDA
	SRS	3	< MDC
FMC	SCDHEC	1	0.05
	SRS	3	< MDC
STC	SCDHEC	1	0.09
	SRS	3	< MDC
LTR	SCDHEC	1	0.05
	SRS	3	< MDC
Hwy. 301	SCDHEC	1	< MDA
	SRS	3	< MDC

Notes:

- NSBLD = New Savannah Bluff Lock and Dam
- UTR = Upper Three Runs
- BDC = Beaver Dam Creek
- FMC = Four Mile Creek
- STC = Steel Creek
- LTR = Lower Three Runs
- Hwy. 301 = Savannah River at U.S. Hwy. 301

MDA = Minimum Detectable Activity
MDC = Minimum Detectable Concentration
SRS data from WSRC 2004
SRS results are means
* includes one result below MDC
** includes two results below MDC

Radiological Monitoring of Fish Data, 2003 ESOP and DOE-SR Data Comparison, 2003

Table 7 Strontium-89,90 Activity Levels in Non-edible Bass pCi/g (DRY)			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	0.15
	SRS	3	0.09*
UTR	SCDHEC	1	0.12
	SRS	3	0.09
BDC	SCDHEC	1	0.16
	SRS	3	0.19
FMC	SCDHEC	1	1.35
	SRS	3	0.17
STC	SCDHEC	1	0.10
	SRS	3	0.08**
LTR	SCDHEC	1	0.16
	SRS	3	<MDC
Hwy. 301	SCDHEC	1	<MDC
	SRS	3	0.08*

Table 8 Strontium-89,90 Activity Levels in Non-edible Catfish pCi/g (DRY)			
Location	Agency	# of samples	Result
NSBLD	SCDHEC	1	0.30
	SRS	3	0.09*
UTR	SCDHEC	1	0.10
	SRS	3	0.09**
BDC	SCDHEC	1	0.17
	SRS	3	0.12
FMC	SCDHEC	1	0.32
	SRS	3	0.06**
STC	SCDHEC	1	<MDC
	SRS	3	0.12
LTR	SCDHEC	1	0.09
	SRS	3	0.10
Hwy. 301	SCDHEC	1	<MDC
	SRS	3	0.16*

Notes:

- NSBLD = New Savannah Bluff Lock and Dam
- UTR = Upper Three Runs
- BDC = Beaver Dam Creek
- FMC = Four Mile Creek
- STC = Steel Creek
- LTR = Lower Three Runs
- Hwy. 301 = Savannah River at U.S. Hwy. 301
- * includes one result below MDC
- ** includes two results below MDC

MDA = Minimum Detectable Activity
 MDC = Minimum Detectable Concentration
 SRS data from WSRC 2004
 SRS results are means
 * includes one result below MDC
 ** includes two results below MDC

4.1.5 Summary Statistics Radiological Monitoring of Fish, 2003

Tritium levels (pCi/L) in Savannah River Fish, 2003

Species	N	Mean	Std. Dev.	Median	Minimum	Maximum
Largemouth bass	8(1)	747	808	587	0	2621
Catfish	8(2)	294	219	315.5	0	583
Spotted sucker	7	566	278	461	247	902

Non-detects () included as zeros

Cs-137 levels (pCi/g) in Savannah River Fish, 2003

Species		N	Mean	Std. Dev.	Median	Minimum	Maximum
Largemouth bass	Edible	8	0.106	0.111	0.056	0.043	0.367
	Nonedible	8(4)	0.042	0.061	0.014	0	0.113
Catfish	Edible	8(3)	0.042	0.042	0.042	0	0.114
	Nonedible	8(5)	0.023	0.033	0.000	0	0.085
Spotted sucker	Edible	7(4)	0.041	0.041	0.045	0	0.101
	Nonedible	7(2)	0.033	0.060	0.000	0	0.154

Non-detects () included as zeros

Sr-90 levels (pCi/g - Dry) in Savannah River Fish, 2003

Species	N	Mean	Std. Dev.	Median	Minimum	Maximum
Largemouth bass	8(1)	0.313	0.496	0.155	0.000	1.520
Catfish	8(3)	0.116	0.115	0.099	0.000	0.471
Spotted sucker	5(2)	0.132	0.144	0.131	0.000	0.345

Non-detects () included as zeros

4.2 Radiological Game Animal Monitoring Adjacent to SRS

4.2.1 Summary

White-tailed deer and feral hogs have access to a number of contaminated areas on the Savannah River Site (SRS), and consequently are a vector for the redistribution of contaminants, including cesium-137 (Cs-137), to off-site locations. ESOP conducts the game animal study to address concerns of potentially contaminated white-tailed deer migrating off the SRS by analyzing game samples collected off-site. The precise ranging behavior of individual deer on the SRS is unknown. Deer have access to contaminated areas on site and it is possible that some animals migrate off-site, where they can be harvested by local hunters. The radionuclide of concern is Cs-137 because of its relatively long physical half-life of 30 years and its availability to game animals and associated health risk to humans. Sampling by ESOP of deer and hogs harvested off-site can provide valuable information concerning the potential off-site exposure to Cs-137. Findings found in the ESOP's Critical Pathway Assessment of SRS and Dose study indicate that radiation exposure from ingestion of deer and hogs are greater than atmospheric and liquid releases combined.

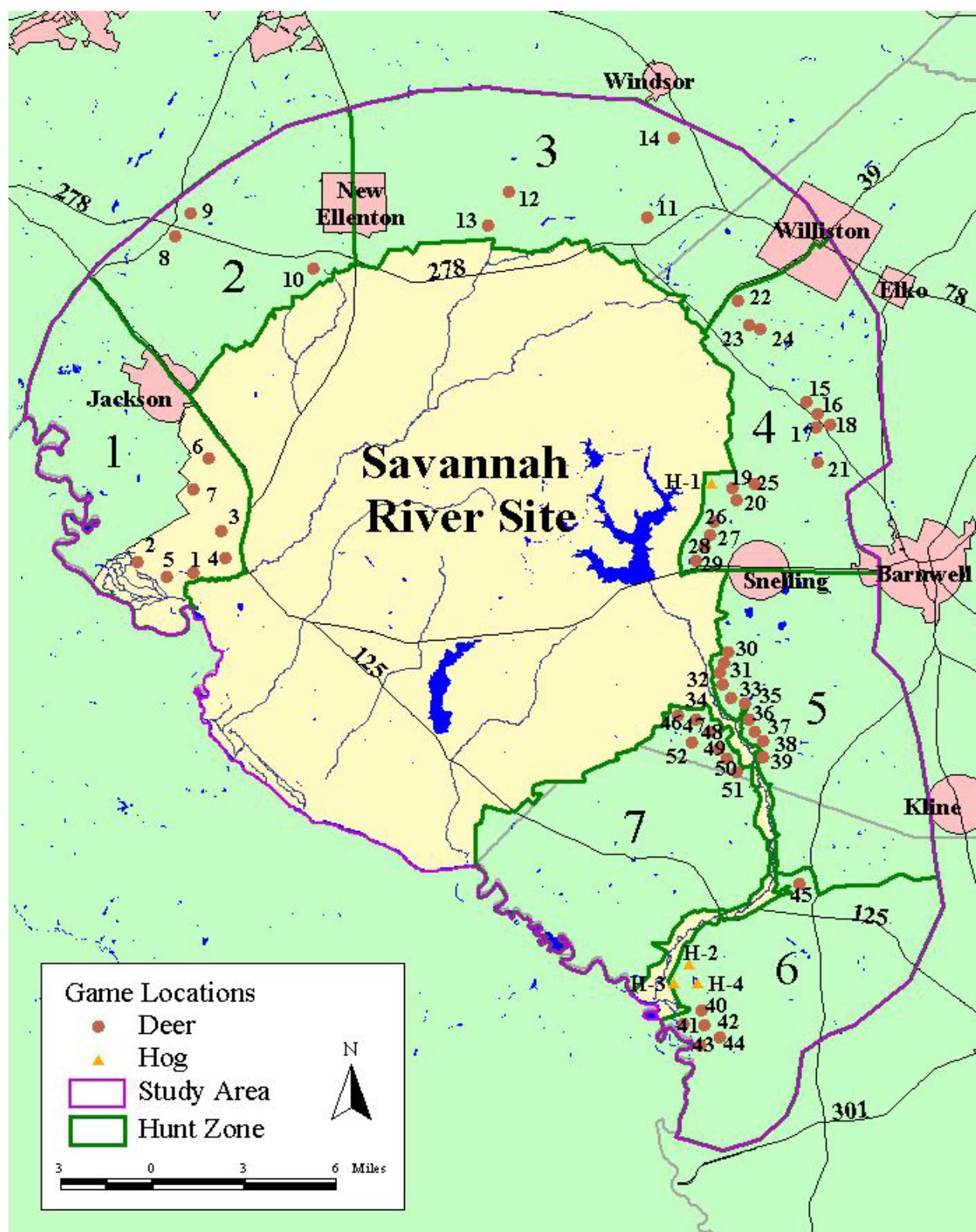
In 2003, SCDHEC analyzed muscle tissue for Cs-137 from 50 deer from within a five-mile study area adjacent to the SRS. Seven tissue samples were also collected and analyzed from a background location 50 miles northeast of the SRS. Cs-137 activities from the 50 white-tailed deer perimeter samples ranged from 0.07 to 5.80 picocuries per gram (pCi/g), with a mean of 1.46 pCi/g. Sample results from the seven deer collected 50 miles northeast of the SRS ranged from 0.49 pCi/g to 2.92 pCi/g, with a mean of 1.17 pCi/g. WSRC reported an approximate field measurement range of 1.0 pCi/g to 17.0 pCi/g, with a mean of 1.29 pCi/g, from 1128 deer harvested on the SRS in 2003. SCDHEC mean values were calculated by using analytical lab data at or above the Minimum Detectable Activity (MDA). Average DOE-SR and SCDHEC Cs-137 concentrations for the past five years are indicated in Figure 1, section 4.2.3.

WSRC does not collect game animal samples within the SCDHEC study area, therefore no direct comparisons could be made between ESOP and DOE-SR.

During our study, slightly elevated Cs-137 (> 1 pCi/g) concentrations were noticed in all of the seven-study area hunting units (section 4.2.4). Age, sex, body weight, soil type and location of collection may affect the Cs-137 activities found in white-tailed deer and hogs. A portion of the elevated Cs-137 activity found in deer harvested in hunt units five and seven may be attributed to historic site operations. Historic site operations released known Cs-137 contamination to lower three runs creek and floodplain, which divides hunt units five and seven. Further, future research may be needed to help determine why elevated Cs-137 activities are found in other hunt units. ESOP will continue to monitor deer and hogs within a five mile study area.

4.2.2

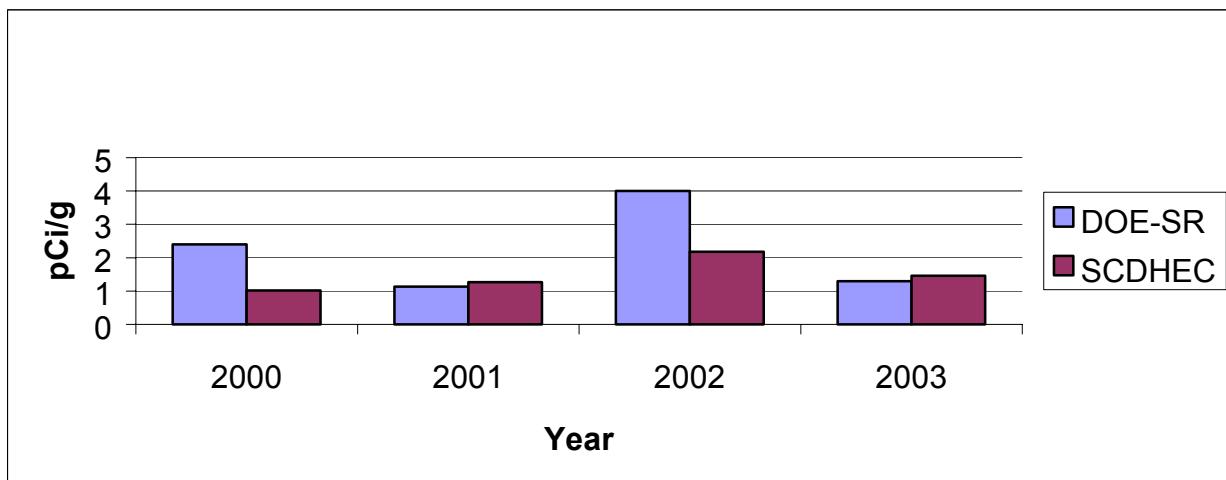
Map 12. Radiological Game Animal Monitoring Adjacent to SRS



4.2.3 Tables and Figures

Radiological Game Animal Monitoring, 2003

Figure 1. Average Cesium-137 Concentration in Deer.



4.2.4 Data**Radiological Game Animal Monitoring Adjacent to SRS Data, 2003**

Background Data	303
Game Animal Monitoring Data	304

Radiological Game Monitoring, 2003
Game Animal Monitoring Background Data

Sample Location		Background	Background	Background	Background
Sample Date		9/12/03	10/12/03	10/16/03	10/29/03
Species		Deer	Deer	Deer	Deer
Sex		Buck	Buck	Buck	Buck
Weight	Pounds	160	150	120	80
Cesium-137	(pCi/g) wet	0.64	0.93	2.92	0.49
Uncertainty	(+/- 2sig)	0.07	0.1	0.26	0.06
MDA	(pCi/g) wet	0.02	0.02	0.04	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location		Background	Background	Background
Sample Date		11/15/03	11/15/03	11/20/03
Species		Deer	Deer	Deer
Sex		Buck	Doe	Buck
Weight	Pounds	120	100	102
Cesium-137	(pCi/g) wet	0.66	1.77	0.78
Uncertainty	(+/- 2sig)	0.08	0.17	0.08
MDA	(pCi/g) wet	0.02	0.02	0.03

Notes:

MDA - Minimum Detectable Activity

Radiological Game Monitoring, 2003

Sample Location	Zone-1	Zone-1	Zone-1	Zone-1	Zone-1
Sample Date	10/17/03	10/17/03	10/17/03	10/17/03	10/17/03
Species	Deer	Deer	Deer	Deer	Deer
Sex	Buck	Buck	Buck	Buck	Doe
Weight	Pounds	175	120	90	95
Cesium-137	(pCi/g) wet	1.97	1.61	1.10	1.27
Uncertainty	(+/- 2sig)	0.19	0.16	0.12	0.13
MDA	(pCi/g) wet	0.02	0.03	0.03	0.03

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-1	Zone-1
Sample Date	10/17/03	10/17/03
Species	Deer	Deer
Sex	Buck	Doe
Weight	Pounds	110
Cesium-137	(pCi/g) wet	0.11
Uncertainty	(+/- 2sig)	0.03
MDA	(pCi/g) wet	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-2	Zone-2	Zone-2	Zone-2	Zone-2	Zone-2
Sample Date	8/18/03	9/21/03	9/23/03	10/21/03	10/27/03	11/20/03
Species	Deer	Deer	Deer	Deer	Deer	Deer
Sex	Buck	Buck	Doe	Doe	Doe	Buck
Weight	Pounds	162	120	110	100	192
Cesium-137	(pCi/g) wet	3.55	2.78	0.41	0.17	0.07
Uncertainty	(+/- 2sig)	0.33	0.27	0.07	0.02	0.03
MDA	(pCi/g) wet	0.03	0.04	0.03	0.02	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-3	Zone-3	Zone-3	Zone-3	Zone-3	Zone-3
Sample Date	12/30/03	12/30/03	8/20/03	8/20/03	10/25/03	10/25/03
Species	Deer	Deer	Deer	Deer	Deer	Deer
Sex	Buck	Doe	Buck	Buck	Doe	Doe
Weight	Pounds	115	100	89	94	100
Cesium-137	(pCi/g) wet	0.37	0.65	3.05	2.43	0.32
Uncertainty	(+/- 2sig)	0.05	0.07	0.29	0.23	0.03
MDA	(pCi/g) wet	0.02	0.02	0.03	0.03	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-4	Zone-4	Zone-4	Zone-4	Zone-4	Zone-4
Sample Date	9/16/03	9/28/03	11/6/03	11/9/03	11/15/03	11/15/03
Species	Deer	Deer	Deer	Deer	Deer	Deer
Sex	Doe	Doe	Buck	Buck	Doe	Doe
Weight	Pounds	90	90	50	115	80
Cesium-137	(pCi/g) wet	1.08	1.01	0.57	1.09	3.07
Uncertainty	(+/- 2sig)	0.11	0.1	0.07	0.11	0.3
MDA	(pCi/g) wet	0.02	0.02	0.02	0.02	0.02

Notes:

MDA - Minimum Detectable Activity

Radiological Game Monitoring, 2003

Sample Location	Zone-4	Zone-4	Zone-4	Zone-4	Zone-4	Zone-4
Sample Date	12/6/03	12/6/03	12/6/03	12/6/03	12/6/03	12/14/03
Species	Deer	Deer	Deer	Deer	Deer	Deer
Sex	Buck	Doe	Doe	Buck	Buck	Buck
Weight	Pounds	165	80	60	120	140
Cesium-137	(pCi/g) wet	1.23	3.88	3.96	5.8	4.43
Uncertainty	(+/- 2sig)	0.13	0.22	0.23	0.33	0.41
MDA	(pCi/g) wet	0.02	0.02	0.02	0.02	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-5	Zone-5	Zone-5	Zone-5	Zone-5	Zone-5
Sample Date	09/10/03	9/15/03	10/5/03	10/12/03	10/16/03	10/19/03
Species	Deer	Deer	Deer	Deer	Deer	Deer
Sex	Buck	Buck	Doe	Buck	Doe	Buck
Weight	Pounds	110	120	75	125	90
Cesium-137	(pCi/g) wet	1.01	0.5	0.85	1.22	1.44
Uncertainty	(+/- 2sig)	0.1	0.06	0.09	0.12	0.14
MDA	(pCi/g) wet	0.03	0.02	0.02	0.02	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-5	Zone-5	Zone-5	Zone-5
Sample Date	11/27/03	12/01/03	12/24/03	12/30/03
Species	Deer	Deer	Deer	Deer
Sex	Doe	Buck	Buck	Buck
Weight	Pounds	110	115	140
Cesium-137	(pCi/g) wet	1.27	0.3	0.62
Uncertainty	(+/- 2sig)	0.13	0.04	0.07
MDA	(pCi/g) wet	0.02	0.02	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-6	Zone-6	Zone-6	Zone-6	Zone-6
Sample Date	12/27/03	12/27/03	12/27/03	12/27/03	12/27/03
Species	Deer	Deer	Deer	Deer	Deer
Sex	Doe	Doe	Buck	Buck	Buck
Weight	Pounds	100	105	95	90
Cesium-137	(pCi/g) wet	0.15	0.07	0.55	0.55
Uncertainty	(+/- 2sig)	0.03	0.03	0.06	0.06
MDA	(pCi/g) wet	0.02	0.02	0.02	0.02

Notes:

MDA - Minimum Detectable Activity

Sample Location	Zone-7	Zone-7	Zone-7	Zone-7
Sample Date	11/19/03	11/19/03	11/27/03	11/27/03
Species	Deer	Deer	Deer	Deer
Sex	Doe	Doe	Doe	Doe
Weight	Pounds	110	60	120
Cesium-137	(pCi/g) wet	1.23	1.23	2.5
Uncertainty	(+/- 2sig)	0.12	0.12	0.19
MDA	(pCi/g) wet	0.02	0.02	0.02

Notes:

MDA - Minimum Detectable Activity

4.2.5 Summary Statistics Radiological Game Monitoring, 2003

Cs-137 concentrations (pCi/g wet weight) in deer collected in 2003.

Study Area	N	Mean	Stdev.	Median	Min.	Max.
Study Area	50	1.46	1.31	1.09	0.07	5.8
Background	7	1.17	0.88	0.78	0.49	2.92

Notes:

N - Number of Samples

Stdev - Standard Deviation

Min - Minimum

Max - Maximum

2003 Critical Pathway

Summary

The Department of Energy Savannah River (DOE-SR) operates the government facility located in South Carolina that produced nuclear materials for the national defense during the cold war era. Throughout its operational history there have been documented instances of radiological materials released to the environment during production activities. A critical pathway assessment of the Savannah River Site (SRS) was performed. The assessment included a review of DOE documented instances of radiological materials released to the environment along with recent data from DOE-SR and the South Carolina Department of Health and Environmental Control (SCDHEC). Additional emphasis was placed on releases that occurred during the past eight years (1993-2000) and on more recent dose estimates to the Maximum Exposed Individual (MEI) through 2003. The SCDHEC new swamp survivalist sportsman scenario dose projections were compared to the phase III "Draft for Public Comment" SRS Dose Reconstruction scenario projections by the United States Center for Disease Control. From these document reviews and recent data, the primary radiological contaminants released by the SRS and the exposure pathways leading from the SRS to the surrounding public have been identified. This assessment only considered radiological contaminants even though there is non-radiological contamination on the SRS. Non-radiological releases will be evaluated by SCDHEC in future updates of the critical pathway review.

Specific radiological contaminant contributions to dose released into the atmosphere by the SRS in 2003 were tritium, iodine-129, cesium-137, plutonium-239 and uranium-238. Radionuclides that make up the key contaminants in liquid releases in 2003 from the SRS include tritium, strontium-90, iodine-129, and cesium-137.

The surrounding public can be potentially exposed to radiological contamination from the SRS through inhalation, ground and sediment shine or dermal absorption, and ingestion exposure routes. The ingestion and inhalation exposure routes are the major mechanisms for exposure to radionuclides released by the SRS. Consumption of vegetation, surface water, fish, and game animals were the major contributors to the ingestion exposure route. The greatest source of radiation exposure is provided through the sportsman on-site and off-site hunter-fisherman exposure pathway. Recent SCDHEC data and DOE-SR data suggest that soil exposure plays a major role in the swamp hunter and fisherman dose. The dose received by the sportsman (on-site hunter, off-site hunter and off-site fisherman) has been greater than the maximally exposed individual (MEI) from all atmospheric and liquid releases. These findings indicate that environmental monitoring programs should focus on the sportsman ingestion, soil exposure, inhalation, drinking water and vegetation exposure pathways.

A projection of recent DOE-SR and SCDHEC exposure data for a future 39-yr period for a SCDHEC new swamp survivalist-sportsman scenario was compared to the phase III CDC maximum dose for life-style scenarios related to children born in 1955 and 1964. The major radionuclide contributors to dose have switched from short-lived radionuclides for the CDC past scenarios to long-lived radionuclides for the future SCDHEC survivalist-sportsman MEI. The total 39-yr dose for the future MEI that would include the on-site sportsman dose would be

greater than the phase III CDC SRS Dose Reconstruction scenarios for the off-site River family and Sportsman family. The potential for high dose releases to the environment of toxic and radiological stored contaminants still exists.

Appropriate early warning monitoring should minimize the risk to the public and the environment from accidental releases of hazardous substances.

2003 Dose Calculation

Summary

Atmospheric and liquid discharges from the Savannah River Site (SRS) are monitored by the Department of Energy – Savannah River (DOE-SR) contractor Westinghouse Savannah River Company (WSRC) Environmental Monitoring Section (EMS). The Environmental Surveillance and Oversight Program (ESOP) of the South Carolina Department of Health and Environmental Control (SCDHEC) also monitors the SRS. DOE-SR and SCDHEC use data from these monitoring activities to calculate the potential radiation dose to the surrounding public. SCDHEC implemented a Radiological Dose Calculation Project in 2002 to calculate the potential exposure dose to the public around the SRS and to evaluate DOE-SR dose calculations published in the SRS Environmental Reports.

The dose estimates produced by SDHEC are calculated from radiation activity concentrations for all exposure media sampled including air, thermoluminescent dosimeters (TLD), milk, edible vegetation, soil, surface water, sediments, drinking water, fish, groundwater, and game animal. Dose concentrations are calculated using standard dose calculations based on the International Commission of Radiological Protection (ICRP) publications 30/48 and the U. S. Environmental Protection Agency (USEPA) Federal Guidance updates (11 & 12) from the Oak Ridge National Laboratory. Data provided to this project are collected from mostly off-site locations and summarized as annual average concentrations for each contaminant to calculate the potential radiation dose to the maximally exposed individual (MEI). The MEI is defined as a hypothetical adult member of the surrounding population who receives the maximum dose from the SRS routine air and liquid releases. Consumption rates used in this project are found in publications by the Nuclear Regulatory Commission, the USEPA, the D.M. Hamby publication, and a 1995 Strange and Chamberlin Multimedia Environmental Pollutant Assessment System exposure pathway model.

Evidence is available to suggest that some radiological contamination is due to fallout from other nuclear plants, past nuclear tests, cosmic components, and naturally occurring radioisotopes. A South Carolina background dose for each project media radioisotope was subtracted from a perimeter dose calculated from data collected at the SCDHEC monitoring stations accessible to the public in the vicinity of the SRS. Evidence is available to suggest that some radiological contamination is due to fallout from other nuclear plants, past nuclear tests, cosmic components, and naturally occurring radioisotopes. All resultant radiological activity concentrations above background, with the exception of up-gradient groundwater and tritium from power plants, are assumed to have originated from the SRS. The SCDHEC dose calculations are an independent estimate of radiological dose to the public near the perimeter of the SRS.

Each exposure media was considered part of different exposure pathways. The SCDHEC sportsman scenario assumed the extreme view that this sportsman was a subsistence and survivalist type of individual who resided in the swamp area downriver below all SRS contributions to the Savannah River. SCDHEC dose calculations indicated that the total dose from all SRS pathways combined contributed less than 4.85-mrem to the swamp dwelling MEI representative, and less than 4.17-mrem for the average perimeter dose to the public in 2003. The total added dose to the general public that could have originated at the SRS was

approximately 60 times less than the typical dose from all naturally occurring sources in the area. The total added dose received in 2003 by the SRS vicinity MEI was less than the dose received from living in a brick or block-house. The overall dose for the downriver public water supplies was approximately the same dose result for both SCDHEC (0.03-mrem) and DOE-SR (0.04 mrem). The comparison of summary statistics for four similar critical pathway media for DOE-SR and SCDHEC estimated dose was within one standard deviation of either average. The similarities and differences in the dose data of both monitoring programs serve to evaluate the impact of DOE-SR operations on the public health and the environment since both monitoring programs arrive at their conclusions independently.

This project uses dose instead of risk so that direct comparisons of dose magnitude can be made with data published in the SRS Environmental Reports. EPA and SCDHEC both use risk calculations when determining clean up levels at Comprehensive Environmental Resource Compensation and Liability Act and Resource Conservation Recovery Act sites.